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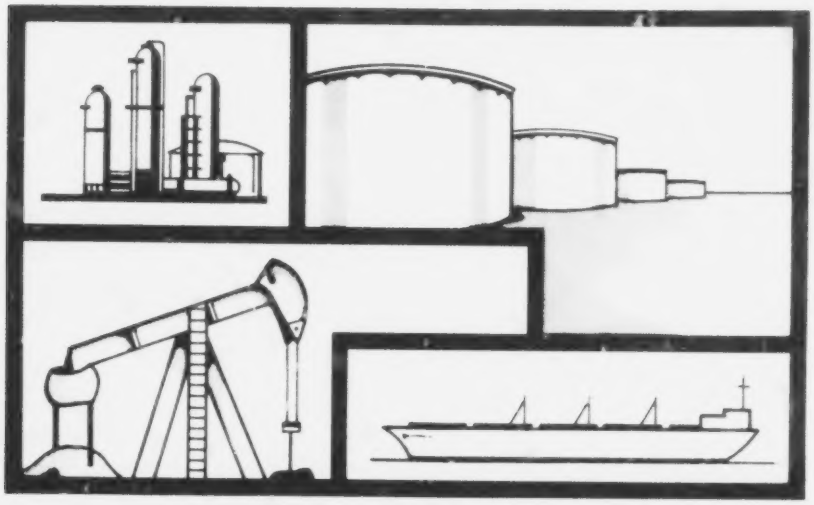
Petroleum Supply Annual 1988

Volume 1



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Petroleum Supply Annual 1988

Volume 1

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Office of Oil and Gas
U.S. Department of Energy
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Preface

The *Petroleum Supply Annual* (PSA) contains information on the supply and disposition of crude oil and petroleum products. The publication reflects data that were collected from the petroleum industry during 1988 through annual and monthly surveys. The *PSA* is divided into two volumes. This first volume contains two sections, Petroleum Supply Summary and Refinery Capacity, each with final annual data. The second volume contains final statistics for each month of 1988, and replaces data previously published in the *Petroleum Supply Monthly* (PSM). The tables in Volumes 1 and 2 are similarly numbered to facilitate comparison between them. Below is a description of each section in Volume 1 of the *PSA*.

Petroleum Supply Summary

This section contains a summary of the data presented each month in the *PSM* and in Volume 2 of the *PSA*. It includes a description of the major events in the petroleum industry during 1988 including trends in supply, consumption, and production. Graphs and tables are provided which show 16 years of data depicting the balance between supply, disposition and ending stocks for various commodities including crude oil, motor gasoline, distillate fuel oil, residual fuel oil and liquefied petroleum gases. Tables also provide 1988 detailed statistics on supply and disposition, refinery operations, imports and exports, stocks, and transportation of crude oil and petroleum products.

Refinery Capacity

This section describes major activities within the refinery industry during 1988. The tables are compiled from the Form EIA-820, *Annual Refinery Report*. Of particular note are listings of facilities and associated capacities in each State. In addition, summaries of corporate refinery capacities, refinery storage facilities in selected States, and refinery shutdowns, sales and mergers during 1988 are provided.

Appendices

Explanatory Notes, located at the end of this publication, present information describing data collection, sources, estimation methodology, data quality control procedures, modifications to reporting requirements and interpretation of tables. Appendix C is provided to inform the user of updated monthly and annual crude oil production statistics received after the publication of the 1987 *PSA*. Industry terminology and product definitions are listed alphabetically in the Glossary.

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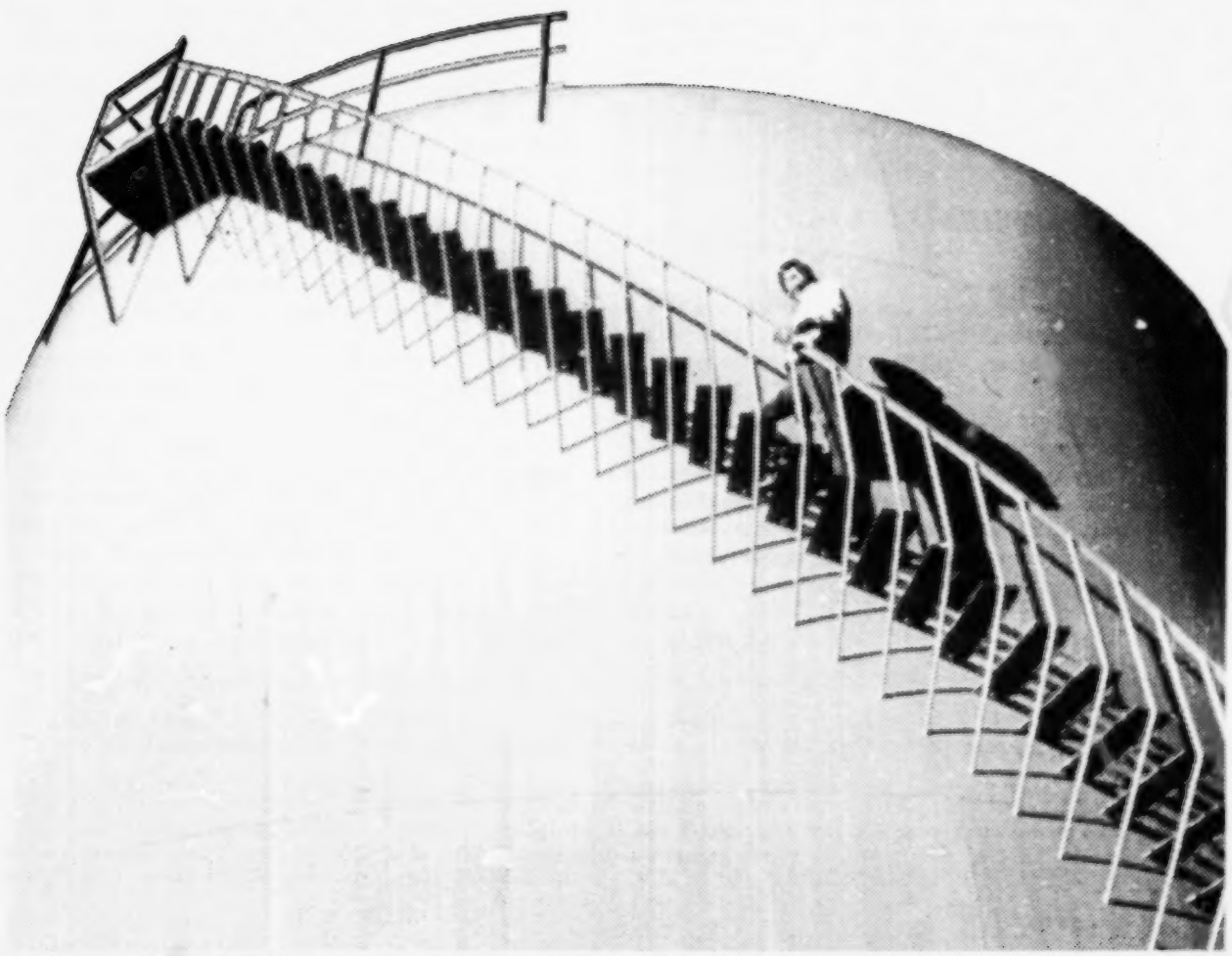
U.S. Petroleum Supply



A refinery worker makes his way around a towering storage tank to check the tank level.

U. S. Petroleum Supply

- by Herbert Franklin and Irvin Chamberlain

Overview

Petroleum product demand rose 0.6 million barrels per day in 1988. This increase elevated U.S. petroleum use to the highest level since 1979. (Demand is measured as "Product Supplied" in the *Petroleum Supply Annual*, and the term is used interchangeably with the term "consumption" throughout this text). Continued economic expansion (up 3.9 percent in terms of real gross national product) and colder temperatures than in 1987 are the principal factors responsible for the sharp increase in petroleum demand during 1988.[1] Competitively priced residual fuel oil and relatively low-cost jet fuel, which contributed to lower air fares, also induced additional use.

As petroleum use continued rising, trends in U.S. petroleum supply activity that began with the crude oil price crash of 1986, continued through 1988. Crude oil prices that had recovered slightly in 1987, again declined because of the Organization of Petroleum Exporting Countries (OPEC) overproduction. It is expected that U.S. proved reserves of crude oil will decline again in 1988 as they did in 1986. Indigenous production of liquid hydrocarbons (crude oil and natural gas liquids) declined and dependence on foreign petroleum increased for the third consecutive year.

Producer's exploration and development budgets were limited in 1988 by low and declining crude oil and natural gas prices and by reluctance of investors to back risky and possibly low-return exploration ventures. Consequently, there was an increasing tendency for producers to favor acquisition of crude oil reserves by purchasing producing leases rather than through relatively high-risk drilling activity.[2] This policy is evidenced by a continuing decline in the number of well completions and the amount of footage drilled during the year.

Indigenous production of liquid hydrocarbons dropped to a level that is 0.8 million barrels per day below the 1985 level. This decline was inevitable in view of the sharp reduction of drilling activity. High levels of drilling activity are needed to sustain output of the mature U.S. oilfields that are suffering a natural decline in productivity. Barring a strong rise in oil prices, the drop in U.S. indigenous production will likely continue. However, certain factors may mitigate the drop somewhat in the near future. An unconventional horizontal drilling technique was employed in some fields during 1988 with the hope of increasing productivity in suitable reservoirs. In addition, a gas-reinjection project is planned to increase reservoir pressure at the Prudhoe Bay, Alaska oilfield; this will partially offset an expected natural decline in productivity at the Prudhoe Bay oilfield.

Because of the continuing decline in domestic production of liquid hydrocarbons, and the continuing sharp rise in domestic use of petroleum, imports rose substantially again in 1988. The inflow of foreign petroleum is now 2.3 million barrels per day higher than it was in 1985 and accounts for nearly 43 percent of U.S. petroleum supply. Crude oil makes up nearly 82 percent of the increased supply of all foreign petroleum since 1985 because refiners have run their facilities at high rates to take advantage of wide margins between crude oil costs and product prices.

Crude oil prices remained low and unstable for the first 5 months of the year and began a definite decline through November as OPEC struggled without success, to maintain some output discipline within its ranks. Average crude oil prices dropped to levels nearly as low as those in 1986, as OPEC crude oil production (excluding Iraq) rose by 1.4 million barrels per day above the 1987 level[3] and nearly 2.8 million barrels per day above its self-imposed 1988 output quota of 15.06 million barrels per day. A new production agreement by OPEC in late November stopped the crude oil price slide in December, but too late for any substantive impact during 1988.

Product Demand

The primary factors that affect change in petroleum product demand are national economic growth trends, petroleum price levels, weather conditions, and efforts to conserve petroleum.

Economic expansion is a strong stimulus for increased consumption of petroleum products on a broad scale. Increased industrial production, transport of goods, provision of services, and sales activities all require greater volumes of fuel. A secondary factor that is related to the state of the economy is the amount of disposable income that is available; an expanding economy increases disposable personal income and the amount of personal funds that can be spent on travel and petrochemical products.

1 Energy Information Administration, *Short-Term Energy Outlook*, January 1989, DOE/EIA-0202(89/1Q), (Washington, DC, February 1989), Table 4.
2 *Oil and Gas Journal*, "U.S. Operators Increasingly Tend to Buy Reserves Rather Than Drill," (Tulsa, Oklahoma, July 11, 1988) pp. 17-19.
3 Energy Information Administration, *International Petroleum Statistics Report*, DOE/EIA-0520(89/03), (Washington, DC, February 1989), Table 1.1.

Note: Unless otherwise referenced, all data reported in this article are from Energy Information Administration publications: *Annual Energy Review 1987*, DOE/EIA-0384(87); *Monthly Energy Review*, December 1988, DOE/EIA 0035(88/12); and *Petroleum Supply Annual 1988*, Volume 1, DOE/EIA-0340(88)/1, and predecessor reports.

Low petroleum prices tend to increase purchases of fuel and petroleum-based products. Discretionary efforts to conserve petroleum fuel are reduced; for example, individuals feel free to drive larger, less fuel-efficient vehicles and to travel more miles. Electric utility and industrial plants will substitute lower-priced petroleum fuel and petrochemical feedstocks, respectively, for more expensive fuel and feedstock types wherever dual-fired boilers or suitable petrochemical processing equipment permit such substitution. When petroleum prices are relatively high, these trends are normally reversed.

Weather changes have an obvious impact on the use of heating fuels in winter. During the summer, additional volumes of residual fuel oil are required as a primary fuel for generating electricity used in air-conditioning units.

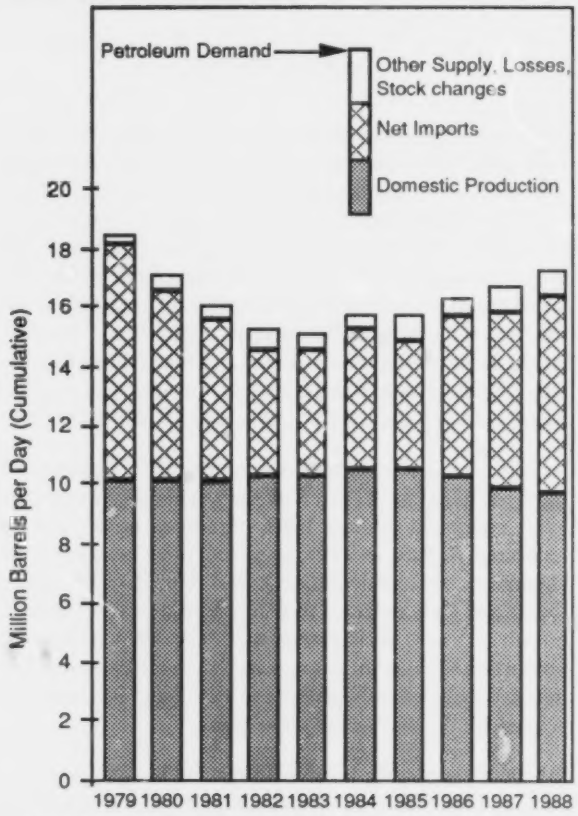
Government conservation programs and discretionary conservation efforts of individuals have become important factors in restraining demand for petroleum. For example, Federal Government mandated automotive-fleet mileage standards and discretionary purchases of smaller, more energy-efficient automobiles have boosted the U.S. passenger car fleet fuel efficiency (miles traveled per gallon) by 44 percent from 1973 to 1987. In addition, tax incentives helped induce improvements in building insulation, and installation of high-efficiency heating and cooling equipment.

The impact of these and other conservation efforts has been felt throughout the economy. In terms of thousand Btu consumed per 1982 dollar of Gross National Product (GNP), petroleum consumption declined from 12.70 in 1973 to 8.50 in 1988 (Table FE1). This represents a 33-percent reduction in petroleum use based on the GNP expressed in constant dollars.

Domestic demand for petroleum products declined from 18.5 million barrels per day in 1979 to 15.2 million barrels per day in 1983 (Figure FE1). The decline which began in 1979 resulted from mandated and price-induced conservation plus economic downturns in 1980 and 1982. During 1984 and 1985, improving economic conditions and declining petroleum prices resulted in a higher level of demand. Total petroleum product demand climbed sharply to 16.3 million barrels per day in 1986, an increase of nearly 0.6 million barrels per day over the 1985 level. This surge in demand was stimulated by a precipitous drop in crude oil prices and continued economic expansion. Petroleum product demand continued its upward movement in 1987 largely on the strength of a moderate 3.4-percent rate of growth in economic activity; however, the 1987 rise was slowed relative to the 1986 increase by greater vehicle efficiency and by higher petroleum prices which may have induced some discretionary conservation (e.g., electric utility switching to natural gas, etc.).

During 1988, petroleum product demand continued the sharp increase that began in 1986, rising 0.6 million barrels per day over the 1987 level. This increase can be attributed principally to the robust growth of the U.S. economy and a colder winter.

Figure FE1. Petroleum Supply and Demand, 1979-1988 [1]



[1] Petroleum demand is measured as product supplied.
Source: Energy Information Administration, *Petroleum Supply Annual 1988*, Volume 1, Table 3, and predecessor reports.

Table FE1. Petroleum Consumption per Constant Dollar of GNP [1]

Year	GNP [1] (trillion 1982 dollars)	Petroleum Consumption (quadrillion Btu)	Petroleum Consumption per Constant Dollar of GNP [1] (thousand Btu per 1982 dollar)
1973	2.744	34.840	12.70
1978	3.115	37.965	12.19
1983	3.279	30.054	9.17
1988	3.996	33.959	8.50

[1] GNP = Gross National Product.
Source: Energy Information Administration, *Monthly Energy Review*, December 1988, Tables 1.4 and 1.7.

Relatively low price levels for jet fuels and residual fuel oil also contributed, albeit to a lesser degree. The increase in demand was restrained somewhat by a small improvement in the overall efficiency of the U.S. vehicle fleet.

Motor Gasoline

Consumption of motor gasoline increased for the sixth consecutive year, rising to 7.3 million barrels per day in 1988. This can be attributed mainly to general economic expansion and a 3.7-percent increase in real disposable personal income which induced higher levels of business and recreational travel.

Despite the sustained 6-year increase in motor gasoline consumption, the 1988 consumption level remains below the peak level of 1978. This illustrates the continuing effectiveness of the broad-scale conservation programs aimed at reducing motor gasoline usage combined with individual discretionary conservation efforts, such as carpooling. However, individual discretionary conservation efforts appear to be waning as only 3 percent of today's buyers of new cars rate fuel economy as their most important consideration when selecting a new car as opposed to 33 percent in 1980 when real gasoline prices peaked.[4] By 1988, average retail prices for unleaded premium motor gasoline had dropped to 75 percent of their 1981 average, thus stimulating demand for higher performance, less fuel-efficient vehicles.

Distillate Fuel Oil

Distillate (diesel) fuel oil is used principally in the transportation sector of the economy to power buses, trucks, trains, and a small percentage of passenger vehicles. Other significant uses are for heating residential and commercial buildings and for firing industrial boilers. About 1 percent of distillate fuel oil is used to fire electric utility boilers.

Demand for distillate fuel oils accounted for the largest portion of the overall increase in petroleum demand during 1988, rising 0.15 million barrels per day. Growth in distillate use was induced by the increasing transportation and industrial needs of the expanding economy and by the relatively cold winter which boosted demand for residential and commercial heating.

Liquefied Petroleum Gases

Industrial facilities, particularly petrochemical plants and petroleum refineries, used nearly three-fourths of the liquefied petroleum gases (LPG's) consumed in 1987. Most of the remainder were used by the residential and commercial sectors, and a small volume was consumed in the transportation sector. In addition to the technical advantage of LPG's as a fuel in petrochemical processing activities, LPG's sometimes have a price advantage over heavier, refinery-processed hydrocarbons for use as petrochemical raw materials.

Although crude oil prices declined in 1988, implying a price advantage for heavier oil-based petrochemical feedstocks, natural gas prices also declined keeping LPG's competitive as feedstocks. Consequently, LPG demand rose to 1.7 million barrels per day principally on the basis of very heavy petrochemical demand. However, a portion of the LPG increase in demand can also be attributed to its increased use in motor gasoline blending activities.

Jet Fuel

Consumption of jet fuel increased to more than 1.4 million barrels per day in 1988. Increased use of jet fuel during 1988 resulted primarily from the expansion in economic activity and disposable personal income which fostered higher levels of business and recreational travel. An additional inducement to increased recreational travel was bargain-priced airfares resulting, in part, from the relatively low cost of kerosene-type jet fuel.

Residual Fuel Oil

The most important use of residual fuel oil is as a primary fuel for electric utility plants. Next in importance is its use as bunkering fuel in ocean-going vessels, and close behind that, as a boiler fuel at industrial plants. A fourth and relatively minor use is as a heating fuel in commercial buildings.

Demand for residual fuel oil reversed its declining trend of 1987 and rose to nearly 1.4 million barrels per day in 1988. This turnaround can be attributed to some price-induced fuel switching from natural gas by electric utilities. However, economic expansion probably also promoted greater use by the industrial and transportation sectors. Commercial buildings used more because of the relatively cold winter season.

Reserves and Production

Indigenous production of liquid hydrocarbons continues to be the principle source of U.S. petroleum supply (Table FE2.) However, the U.S. production base consists mainly of old

[4] *Oil Daily*, "The Real Issue: Jobs, Not the Environment," (Washington, DC, September 19, 1988), p. 7.

Table FE2. U.S. Petroleum Supply--Salient Statistics, 1979-1988

Supply Elements	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Indigenous Production (million barrels per day)										
Crude Oil	8.6	8.6	8.6	8.6	8.7	8.9	9.0	8.7	8.3	8.1
Natural Gas Liquids	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Other[1]	s	s	s	.1	.1	s	.1	.1	.1	.1
Total[2]	10.2	10.2	10.2	10.3	10.3	10.6	10.6	10.3	10.0	9.8
Imports (million barrels per day)										
Crude Oil (Industry)	6.5	5.2	4.1	3.3	3.1	3.2	3.1	4.1	4.6	5.1
Crude Oil (SPR)[3]	.1	s	.3	.2	.2	.2	.1	s	.1	.1
Products	1.9	1.6	1.6	1.6	1.7	2.0	1.9	2.0	2.0	2.3
Total[2]	8.5	6.9	6.0	5.1	5.1	5.4	5.1	6.2	6.7	7.4
Exports (million barrels per day)										
Crude Oil	.2	.3	.2	.2	.2	.2	.2	.2	.2	.2
Products	.2	.3	.4	.6	.6	.5	.6	.6	.6	.7
Total[2]	.5	.5	.6	.8	.7	.7	.8	.8	.8	.8
Total Net Imports (million barrels per day)	8.0	6.4	5.4	4.3	4.3	4.7	4.3	5.4	5.9	6.6
Stock Withdrawal (million barrels per day)										
Crude Oil (Industry)	(.1)	(.1)	s	s	s	(s)	.1	(s)	(s)	.1
Crude Oil (SPR)[3]	(.1)	(s)	(.3)	(.2)	(.2)	(.2)	(.1)	(.1)	(.1)	(.1)
Products	(s)	(s)	.1	.3	.2	(.1)	.2	(.1)	.1	s
Total[2]	(.2)	(.1)	(.2)	.1	s	(.3)	.1	(.2)	(s)	s
Products Supplied (million barrels per day)										
Motor Gasoline	7.0	6.6	6.6	6.5	6.6	6.7	6.8	7.0	7.2	7.3
Distillate Fuel Oil	3.3	2.9	2.8	2.7	2.7	2.8	2.9	2.9	3.0	3.1
Residual Fuel Oil	2.8	2.5	2.1	1.7	1.4	1.4	1.2	1.4	1.3	1.4
Jet Fuels	1.1	1.1	1.0	1.0	1.0	1.2	1.2	1.3	1.4	1.4
Liquid Petroleum Gases	1.6	1.5	1.5	1.5	1.5	1.6	1.6	1.5	1.6	1.7
Other Petroleum	2.7	2.5	2.1	1.9	2.0	2.0	2.0	2.1	2.2	2.3
Total	18.5	17.1	16.1	15.3	15.2	15.7	15.7	16.3	16.7	17.3
Year-End Stocks (million barrels)										
Crude Oil (Industry)	339	358	363	350	344	345	321	331	349	330
Crude Oil (SPR)[3]	91	108	230	294	379	451	493	512	541	560
Products	911	926	891	786	731	760	705	750	718	707
Total[2]	1,341	1,392	1,484	1,430	1,454	1,556	1,519	1,593	1,607	1,597
Average Refiner Acquisition Cost of Crude Oil (dollars per barrel)	17.72	28.07	35.24	31.87	28.99	28.63	26.75	14.55	17.90	14.71
Average Domestic First Purchase Price of Crude Oil (dollars per barrel)	12.64	21.59	31.77	28.52	26.19	25.88	24.09	12.51	15.40	12.57

[1] Includes other hydrocarbons and alcohol.
[2] Totals may not equal sum of components due to independent rounding.
[3] SPR = Strategic Petroleum Reserve.
s = Less than 0.05 million barrels per day.
( ) = Stock build.
Sources: Energy Information Administration, *Annual Energy Review 1987*; Energy Information Administration, *Petroleum Supply Annual 1988*, Volume 1 and predecessor reports; Energy Information Administration, *Monthly Energy Review*, December 1988.

fields with declining reservoir pressures.[5] Average crude oil productivity per well dropped from a peak level of 18.4 barrels per day in 1972 to 13.4 barrels per day in 1987. Areas believed to have most of the remaining potential for finding large, prolific fields are in high-cost environments (i.e., deep water and Arctic regions).[6]

U.S. companies have been unable to sustain significant increases in national production of liquid hydrocarbons despite vast capital expenditures in the early 1980's (Table FE3). In fact, these large investments merely enabled U.S. companies to slow an inevitable production decline resulting from the predominance of old, heavily worked fields that characterize much of the U.S. petroleum production base.

Total U.S. liquid hydrocarbon production (from Alaska plus the lower 48 States) reflects highly stable production activity from 1980 through 1983. However, this overall picture of stability hides a very important distinction between production from Alaska and from the lower 48 States. Alaskan output has been growing annually since its North Slope fields began production in 1977; the only exception was in 1981 when a small decline occurred. On the other hand, production from the lower 48 States has been declining because of the predominance of old fields that are suffering a natural drop in productivity.

The declining trend of production in the lower 48 States was reversed in 1983 and 1984 by the effects of extensive infill development (drilling of additional wells between existing wells in a producing reservoir) as indicated by the relatively high level of well completions in the early 1980's (Table FE3). When the increased production from the lower 48 States complemented growing Alaskan output in 1984, total U.S. production turned sharply upward. As the effects of intensive drilling activity in the early 1980's began to wane, lower 48-State production resumed its downward trend, but total U.S. liquid hydrocarbon production was buoyed by expanding Alaskan production that helped the United States achieve an overall production gain in 1985.

The crude oil price crash of 1986 caused many unprofitable stripper wells to be shut in. During 1986, liquid hydrocarbon production dropped, on average, by 0.3 million barrels per day, reversing the gain made in 1984. The smaller number of producing wells, combined with declining productivity in many of the producing wells led to further declines in production during 1987 and 1988.

Table FE3. Crude Oil Prices, Capital Expenditures, and Well Completions

Year	Crude Oil First Purchase Price (dollars per barrel)	Capital Expenditures [1] (billion dollars)	Well Completions (thousand wells)
1979.....	12.64	25.8	51.91
1980.....	21.59	40.2	69.84
1981.....	31.77	65.4	90.03
1982.....	28.52	60.4	83.43
1983.....	26.19	50.5	74.90
1984.....	25.88	52.0	84.35
1985.....	24.09	48.7	69.18
1986.....	12.51	30.4	38.43
1987.....	15.40	27.1	34.25
1988.....	12.57	NA	30.45

[1] Capital expenditures for exploration and production.
NA= Not available.
Sources: Crude Oil Prices -- Energy Information Administration, *Monthly Energy Review*, December 1988, Table 9.1; Capital Expenditures -- Energy Information Administration, *Financial Reporting System* (Form EIA-28); Well Completions -- Energy Information Administration, *Monthly Energy Review*, December 1988, Table 5.2.

Proved Reserves

Proved reserves make up the defined pool of hydrocarbons from which U.S. companies can currently extract oil and gas. They constitute the domestic petroleum production base and are the primary source of oil and gas used in the United States. To the extent that this pool of oil and gas cannot satisfy domestic needs, the United States must draw down stocks or look abroad for additional supplies to meet current demand.

When a newly drilled exploratory well penetrates an oil or gas bearing zone or reservoir, an estimate of the discovered volume of proved reserves can be made. This estimate is based upon the initial flow data, thickness of the reservoir found, its apparent areal extent, and electrical and other measurements taken inside the hole that provide information about reservoir rock porosity (void space), permeability (ability to conduct fluid flow), fluid saturations, pressures, and temperatures. The estimate of proved reserves is based on a limited amount of data available from the single well and interpretation of any seismic or other geologic data that are available. Therefore, it is emphasized that this estimate is only a preliminary judgment as to the amount of oil and gas in place that has been found and the amount that can be economically recovered.[7]

Estimates of the volume of total U.S. proved reserves are continually changing as greater knowledge of the oil reservoirs is gained by increased drilling and well development. As additional wells are completed, the extent of a reservoir can be more accurately delineated. This sometimes results in a reassessment of the volume of oil contained in the reservoir; additional volumes are referred to as "extensions."[7]

[5] Energy Information Administration, *Impact of Surveillance Production in the United States*, DOE/EIA-0459, (Washington, DC, November 1984), p. 11.
[6] National Petroleum Council, *Factors Affecting U.S. Oil and Gas Outlook*, (Washington, DC, February 1987), P. 126.
[7] Energy Information Administration, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves*, DOE/EIA-0216 (87), (Washington, DC, October 1988), pp. 2, 101.

Substantial costs are associated with well-drilling activity. The magnitude of drilling activity undertaken by investors relates directly to current crude oil and natural gas price levels and to the perceived nature of future price trends. Average crude oil first-purchase (wellhead) prices plummeted 48 percent in 1986 (Table FE3). Prices recovered somewhat during 1987 but declined again in 1988, thereby displaying a continuing price instability. Wellhead prices for natural gas have declined 36 percent since 1984. These downward price trends and price instability are reflected in the precipitous drop of 44 percent in well completions during 1986 and a decline of an additional 21 percent through 1988 (Table FE3).

As well completions dropped in 1986, proved reserves of liquid hydrocarbons followed, dropping 3.6 percent (Table FE4). Even though well completions declined an additional 11 percent in 1987 (Table FE3), proved reserves of liquid hydrocarbons increased by 349 million barrels. This anomaly is due to a large upward revision in crude oil reserve estimates rather than new discoveries.[8]

Data are not yet available on reserve development activity in 1988. However, on the basis of price trends and the number of well completions reported for the year, some inferences can be made.

In 1988, crude oil wellhead prices declined to an average monthly level of $12.57 per barrel (Table FE2). Low and declining prices in 1988 curtailed drilling activity during the year as evidenced by fewer well completions and less footage drilled than in 1987; the lower number of well completions implies a decline in the number of reservoir extensions and new discoveries and, hence, an overall decline in U.S. proved reserves.

Table FE4. Proved Reserves of Liquid Hydrocarbons
(Million Barrels)

Year	Crude Oil	Natural Gas Liquids	Total
1978	31,355	6,772	38,127
1979	29,810	6,615	36,425
1980	29,805	6,728	36,533
1981	29,426	7,068	36,494
1982	27,858	7,221	35,079
1983	27,735	7,901	35,636
1984	28,446	7,643	36,089
1985	28,416	7,944	36,360
1986	26,889	8,165	35,054
1987	27,256	8,147	35,403

Source: Energy Information Administration, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves 1987 Annual Report*, Table 1.

Furthermore, drilling activity within the United States during 1988 was oriented toward low-risk and low-cost development projects; this implies that reserve additions in 1988 will be attributable mainly to reassessment of existing reservoirs rather than discoveries of new fields and reservoirs. To complement this relatively low-risk, low-cost drilling activity, many companies are acquiring additional reserves through the purchase of producing leases.[9] If the focus on low-risk development projects and reserve acquisition through purchases continues, U.S. petroleum reserves will dwindle rapidly as domestic demand grows and discoveries of new reservoirs and oilfields decline.

Indigenous Production

As noted earlier, most U.S. producing fields are old and are experiencing a natural decline in productivity. Of great significance for the U.S. petroleum supply is the additional oil that can be extracted from known deposits by increasing the number of wells penetrating an oil reservoir; this brings larger portions of the reservoir closer to production outlets. This conventional recovery method, known as infill development, has been the chief means of increasing production from a reservoir in recent years.[10]

Without increased production from prolific new fields and/or sustained high levels of infill drilling and the application of enhanced oil recovery techniques, overall U.S. production of liquid hydrocarbons will decline.

Drilling activity (as measured by the average number of rotary rigs in operation) during 1988 remained at the same level as in 1987 with a weekly average of 936 rotary rigs in operation. Despite this parity in rotary rig activity, about 3,800 fewer wells were completed and nearly 13 million fewer feet were drilled.

To help combat the problem of declining indigenous production, an unconventional technique (horizontal drilling) is gaining popularity. It is believed that horizontal wellbores can increase production in some reservoirs dramatically.[11] The main reason is that horizontal wells can reach larger portions of some reservoirs, particularly those with a relatively small vertical extent and an expansive horizontal length. In addition, current technology allows horizontal wells to be drilled below the gas cap or above the oil/water contact where oil structures are associated with gas or water; this eliminates the production of unwanted gas or water. Another advantage of horizontal wells is that such wells drilled into fractured reservoirs, expose more of the oil-laden fractures to the wellbore. These advantages lead some experts to believe that as many as 30 percent of all wells drilled in the next decade will be of this type.

[8] Energy Information Administration, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves*, DOE/EIA-0216 (87), (Washington, DC, October 1988), Table 1.
[9] *Oil and Gas Journal*, "U.S. Operators Increasingly Tend to Buy Reserves Rather Than Drill," (Tulsa, Oklahoma, July 11, 1988), pp. 17-19.
[10] National Petroleum Council, *Factors Affecting U.S. Oil and Gas Outlook*, (Washington, DC, February , 1987), p. 129.
[11] *Petroleum Intelligence Weekly*, "The Next Best Thing to Finding a Giant Oilfield?" (New York, NY, October 3, 1988), pp.4, 5.

Total indigenous production of liquid hydrocarbons during 1988 continued the annual decline that began in 1986 after 6 years of small to moderate gains. The 1988 decline in production can be attributed to two principal factors. First, and perhaps foremost, the decrease in annual well completions since 1985 (Table FE3) implies a decline in the requisite infill development necessary to stem the natural decline in productivity suffered by most U.S. oil fields. Second, crude oil prices have not risen enough to induce operators to reopen many of the stripper wells that were closed since 1986.

More than three-fourths of total U.S production takes place in five regions; Texas, Alaska, California, Federal Offshore regions, and Louisiana (Table FE5). All of these regions except Alaska experienced production declines in 1988. The combined decrease in production for Texas, California, Federal Offshore regions, and Louisiana amounted to 71.3 million barrels. The largest drop of 25.9 million barrels occurred in the Federal Offshore regions of the Gulf where the relatively costly offshore production apparently suffered because of the industry focus on low-cost development activity. The second largest decline in production occurred in Texas where a drop of nearly 25.5 million barrels took place; this region, perhaps most dependent on substantial infill development and enhanced recovery techniques, may have received more attention than offshore Gulf regions because of relatively low-costs. California and Louisiana suffered the largest proportion of their production declines in their onshore fields which account for the major part of their production.

Table FE5. Crude Oil Production by Major Producing Regions
(Million Barrels)

Geographic Region	1986	1987	1988
Texas	819.6	761.0	735.5
Onshore	817.5	759.2	734.0
Offshore (State)	2.1	1.8	1.5
Alaska	681.3	716.0	738.1
Onshore	665.9	693.2	687.3
Offshore (State)	15.4	22.7	50.9
California	378.1	364.6	354.7
Onshore	343.4	334.2	326.6
Offshore (State)	34.7	30.4	28.2
Federal Offshore	378.9	356.6	330.7
PAD District III	350.3	325.5	299.5
PAD District V	28.6	31.1	31.3
Louisiana	181.8	175.0	165.0
Onshore	155.2	149.9	140.3
Offshore (State)	26.6	25.2	24.7
Other States	728.6	674.2	655.0
Total U.S.	3,168.3	3,047.4	2,979.1

Note: Regional totals may not equal sums of components due to independent rounding.

Sources: Energy Information Administration, *Petroleum Supply Annual 1988*, Volume 1, Table 9 and predecessor reports.

Of the major producing regions, only Alaska showed an increase in production levels during 1988. Alaska's oil fields have not yet experienced the same magnitude of loss in natural reservoir pressure that plagues the older producing areas of the lower 48 States. However, some Alaskan producing reservoirs are expected to begin to experience declines in productivity within the next few years. A planned expansion of gas handling facilities at the Prudhoe Bay field will allow natural gas to be re-injected into the oil field to increase reservoir pressures and offset to some degree the expected natural decline in productivity.[12] In 1988, about 93 percent of Alaskan production came from two fields: Prudhoe Bay (1.57 million barrels per day) and Kuparuk River (0.30 million barrels per day). The next most significant producing field was the new Endicott field which began deliveries to the Trans-Alaskan Pipeline in October 1987;[13] it produced at a rate of 0.10 million barrels per day in 1988.

Foreign Trade

Imports of petroleum are needed to satisfy the portion of U.S. petroleum demand that cannot be met by domestic production and stock drawdown. Domestic production is likely to continue its decline of the past 3 years. Stock drawdown satisfies seasonal demand surges but ordinarily has little impact on meeting annual demand. From 1986 through 1988, low crude oil prices contributed to reduced domestic petroleum production on the one hand and large increases in petroleum product demand on the other. The inevitable result was a large increase in imports in 1986 and smaller, but significant increases in imports in 1987 and 1988.

Exports make up only a small portion of total U.S. foreign trade in petroleum. U.S. refiners use exports as an outlet for domestically refined products that are in excess of regional needs or unsuitable for domestic use.

Foreign Dependence

When domestic petroleum demand reached its highest level in 1978, the United States was heavily dependent on imported oil. Net imports dropped 46 percent from 1979 through 1985, as the gap between domestic production and demand narrowed

[12] *Oil and Gas Journal*, "Prudhoe Gas Plant Expansion to Hike Oil Output in 1990," (Tulsa, Oklahoma, July 11, 1988), p. 30.
[13] Alaskan Oil and Gas Conservation Commission Bulletin, December 1987, p. 1.

(Figure FE1). The need for imported oil diminished over this period mainly because of a price-induced drop in demand of 15 percent, but also in response to a 4-percent increase in domestic production.

The price crash of 1986 caused a reversal in this trend. During 1986 and 1987, indigenous production of liquid hydrocarbons dropped, low petroleum prices led to some stock building, and use of petroleum increased. The result was an increase in U.S. imports of 1.6 million barrels per day over the 2-year period.

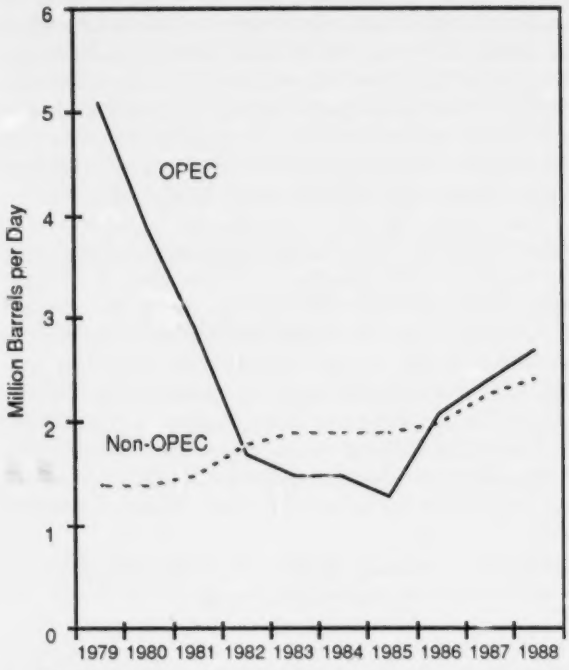
During 1988, U.S. imports increased to 7.4 million barrels per day; this is 0.7 million barrels per day above the 1987 level and 2.3 million barrels per day above 1985 imports. The increase in U.S. dependence on foreign petroleum can be attributed primarily to a growing need for petroleum products by the robust U.S. economy and to the inability of the United States to meet these growing petroleum needs from domestic resources. Since 1985, domestic petroleum demand has increased 1.6 million barrels per day while indigenous production has declined 0.8 million barrels per day; the deficit has been made up largely from an increase in net imports of 2.3 million barrels per day (Figure FE1).

In keeping with historical patterns since the mid-1970's, crude oil imports made up by far, the largest portion of total U.S. petroleum imports, more than doubling product receipts. Crude oil imports rose 0.4 million barrels per day above the 1987 level for a 1988 average level of 5.1 million barrels per day. The large increase in crude oil imports was needed to supplement declining levels of indigenous production and a relatively large stock drawdown as refiners ran their facilities at near-capacity levels to take advantage of attractive profit margins.

Product imports increased about 0.3 million barrels per day over the 1987 level. The increase in product import levels was needed mainly to satisfy increased demand for distillate and residual fuel oil and jet fuels that could not be met from domestic refinery output. Additional foreign supplies of LPG's allowed a small stock-build despite very heavy demand by petrochemical manufacturers. Although there was no substantial overall increase in motor gasoline import levels in 1988, high levels of imports in the summer were essential in meeting very heavy summer demand and for replacing stocks that had been severely depleted during June.

As crude oil imports increased, U.S. dependence on OPEC also increased but remains far below the levels of the late 1970's and early 1980's (Figure FE2). OPEC provided 53 percent of U.S. crude oil imports in 1988 (Table FE6). About 28 percent of U.S. crude oil imports comes from the politically volatile Persian Gulf region. An additional 38 percent comes from nearby Western Hemisphere nations.

Figure FE2. OPEC Versus Non-OPEC Imports of Crude Oil, 1979-1988



Sources: Energy Information Administration, *Petroleum Supply Annual 1988*, Volume 1, Table 15, and predecessor reports.

Export Trends

U.S. refiners function primarily to meet U.S. petroleum product demand. However, there is often an imbalance between refinery yield and product demand within a refiner's market area, causing the refiner to market excess products either in another domestic region or in foreign areas.[14]

Most petroleum products are exported from the Gulf Coast (Petroleum Administration for Defense (PAD) District III) and the West Coast (PAD District V), where the first and third heaviest concentrations of U.S. refinery capacity, respectively, are situated. Production and export of heavy products is greatest from the West Coast because of the large volumes and physical makeup of the very heavy crude oils (averaging 25.33 degrees API gravity) that are processed there. In addition, product specifications (e.g., sulfur levels) may preclude the use of some locally produced fuel oils in parts of that region. Exports from the Gulf Coast can be attributed mainly to the large volume of products refined; 46 percent of U.S. refinery production occurred there in 1988.

Total export levels have nearly doubled over the past decade but have remained fairly stable since 1982 (Table FE7). Petro-

[14] National Petroleum Council, *U.S. Petroleum Refining*, (Washington, DC, October 1986), p. 6.

Table FE6. Gross Imports of Crude Oil by Country of Origin, 1979-1988
(Million Barrels per Day)

Country of Origin	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Arab OPEC										
Algeria	0.61	0.46	0.26	0.09	0.18	0.19	0.08	0.08	0.11	0.06
Iraq	.09	.03	.00	s	.01	.01	.05	.08	.08	.34
Kuwait	.01	.03	.00	s	.01	.02	s	.03	.07	.08
Qatar	.03	.02	.01	.01	.00	s	.00	.01	.00	.00
Saudi Arabia	1.35	1.25	1.11	.53	.32	.31	.13	.62	.64	.90
United Arab Emirates	.28	.17	.05	.08	.02	.09	.04	.04	.06	.02
Libya	.64	.55	.32	.02	.00	.00	.00	.00	.00	.00
Neutral Zone	-	-	-	-	-	-	-	-	-	.01
Subtotal Arab OPEC	3.00	2.50	1.77	.74	.53	.63	.30	.85	.96	1.41
Other OPEC										
Ecuador	.03	.02	.04	.03	.06	.05	.06	.06	.02	.03
Gabon	.04	.03	.04	.04	.06	.06	.05	.02	.03	.02
Indonesia	.38	.31	.32	.23	.32	.30	.29	.30	.26	.19
Nigeria	1.07	.84	.61	.51	.30	.21	.28	.44	.53	.61
Venezuela	.29	.16	.15	.16	.16	.25	.31	.42	.49	.44
Iran	.30	.01	.00	.04	.05	.01	.03	.02	.10	s
Subtotal Other OPEC	2.11	1.36	1.15	1.00	.94	.88	1.01	1.26	1.43	1.28
Total OPEC	5.11	3.86	2.92	1.73	1.48	1.51	1.31	2.11	2.40	2.70
Non-OPEC										
Mexico	.44	.51	.47	.65	.77	.66	.72	.62	.60	.67
Canada	.27	.20	.16	.21	.27	.34	.47	.57	.61	.68
United Kingdom	.20	.17	.37	.44	.37	.38	.28	.32	.30	.25
Trinidad and Tobago	.12	.12	.10	.09	.08	.09	.10	.09	.08	.07
Angola	.04	.04	.05	.04	.07	.09	.10	.10	.18	.20
Norway	.08	.14	.11	.10	.07	.11	.03	.05	.07	.06
Colombia	.00	.00	.00	.00	.00	.00	.00	.06	.11	.11
All Other	.26	.22	.21	.22	.23	.25	.20	.25	.32	.36
Subtotal Non-OPEC	1.41	1.40	1.47	1.76	1.85	1.91	1.89	2.07	2.27	2.41
Total Imports	6.52	5.26	4.40	3.49	3.33	3.43	3.20	4.18	4.67	5.11

s=Less than 0.005 million barrels per day.
Note: Totals may not equal sums of components due to independent rounding. Prior to 1988, data on imports from the Neutral Zone were included with imports from Saudi Arabia and Kuwait.
Source: Energy Information Administration, *Petroleum Supply Annual 1988*, Volume 1, Table 15 and predecessor reports.

Table FE7. Exports of Crude Oil and Major Products, 1979-1988
(Million Barrels per Day)

Commodity	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Crude Oil	0.24	0.29	0.23	0.24	0.16	0.18	0.20	0.15	0.15	0.15
Natural Gas Liquids	.02	.02	.04	.07	.07	.05	.06	.04	.04	.05
Distillate Fuel Oil	s	s	s	.07	.06	.05	.07	.10	.07	.07
Residual Fuel Oil	.01	.03	.12	.21	.19	.19	.20	.15	.19	.20
Petroleum Coke	.15	.14	.14	.16	.20	.19	.19	.24	.21	.23
Other Products	.06	.06	.06	.08	.06	.06	.06	.10	.11	.11
Total Exports	.47	.54	.60	.82	.74	.72	.78	.78	.76	.82

s=Less than 0.005 million barrels per day.
Note: Totals may not equal sums of components due to independent rounding.
Source: Energy Information Administration, *Petroleum Supply Annual 1988*, Volume 1, Table 16 and predecessor reports.

leum coke and residual fuel oil continue to be the principal export products. During 1988, about 42 percent of petroleum coke production and 22 percent of residual fuel oil output were exported. Residual fuel oil exports dropped in 1986 because of increased use by domestic electric utilities, as residual fuel oil benefitted from a price advantage over natural gas. In 1987, the residual fuel oil price advantage disappeared and electric utilities with dual-firing capability switched back to cheaper natural gas.

During 1988, residual fuel oil again benefitted from a competitive price with natural gas and again consumption increased. However, high levels of residual fuel oil production accruing from high-level utilization of refinery distillation capacity and continued moderately high levels of cost-saving residual fuel oil imports left some refiners with excess supplies. Consequently, residual fuel oil exports remained high despite increased consumption levels.

Exports of crude oil are restricted to crude oil produced from fields under the State waters of Alaska's Cook Inlet, certain domestically produced crude oil destined for Canada, and shipments to U.S. territories. Nearly 92 percent of the total crude oil exported went to U.S. territories in the Caribbean. Most of the remainder was exported to Canada and a small volume was shipped to China (Taiwan).

Inventory Activity

Petroleum products are produced and delivered to consumers via complex interrelated systems of transportation, storage,processing, and distribution. The storage segment of this interrelated network and the inventories contained therein play a vital role in assuring an uninterrupted and adequate flow of petroleum products to consumers.

The primary concern of inventory managers is to ensure that a minimum operating inventory (MOI) is maintained at critical points throughout the transportation, processing, and distribution network. Minimum operating inventory is defined by the National Petroleum Council as "the level of inventory that is necessary to maintain smooth operations and avoid runouts and below which operating problems and shortages would begin to appear in a defined distribution system." The MOI is a fairly stable inventory level that changes slowly in response to major structural changes in the transportation, processing, and distribution systems. Inventory levels above the MOI are much more volatile and change more frequently in response to short-term changes in petroleum demand, financial conditions, and political developments that may threaten the security of petroleum supply flows.

Petroleum product stock levels declined to 705 million barrels by the end of 1985, generally following a long-term decline in petroleum demand which began in 1979 (Table FE2). Industry crude oil stocks remained fairly stable throughout the same period.

Ample crude oil stocks afforded refiners an opportunity to meet product demand by using underutilized refining capacity to convert crude oil into needed products. During 1986, product inventories were boosted to 750 million barrels, as refiners operated closer to distillation capacity limits and higher product stocks were considered necessary in view of climbing demand. Very low crude oil acquisition costs and low inventory holding costs induced a buildup of 10 million barrels in privately owned crude oil inventories. Total privately owned industry stocks dropped about 14 million barrels in 1987 as crude oil stocks rose by 18 million barrels in response to anticipated higher price levels. The crude oil stock increase was offset by a 32-million barrel drawdown of product stocks, perhaps resulting from demand of secondary stockholders with expectations of future price increases.

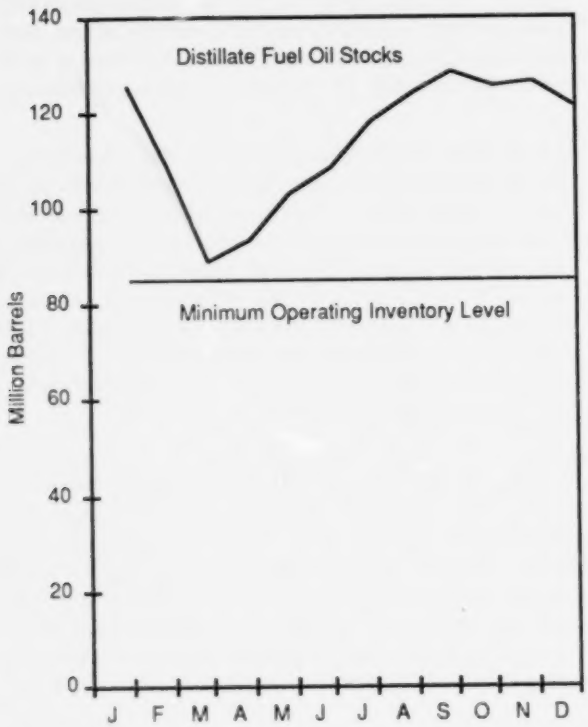
During 1988, industry primary stocks declined for the second straight year following the large buildup in 1986. Crude oil inventories were down 19 million barrels from ending 1987 levels and product stocks dropped more than 10 million barrels. Several factors contributed to the depletion of stocks but the most significant factors were declining crude oil prices and very heavy product demand.

Crude oil stocks expanded during the first half of 1988 in response to low prices and uncertain future price trends. However, during the latter half of the year, crude oil stocks were drawn down as refiners utilized their crude oil inventories rather than imported crude oil. Refiners apparently expected to replace their crude oil stocks at lower prices as overproduction by OPEC caused crude oil prices to decline (Table FE2). High-level domestic refinery operations, induced by wide margins between crude oil and product prices, was also a principal factor in depletion of crude oil stocks.

Product stocks generally followed normal seasonal trends. A relatively cold winter heightened normal demand for distillate heating fuels in the winter months; most of this winter demand was met by domestic refinery production but stock drawdown was the second most significant source of supply as declining fuel oil prices afforded inventory managers an opportunity for future stock replenishment at lower prices (Figure FE3). The drawdown of distillate stocks during the winter months is the principal reason for an overall decline in product stocks during 1988.

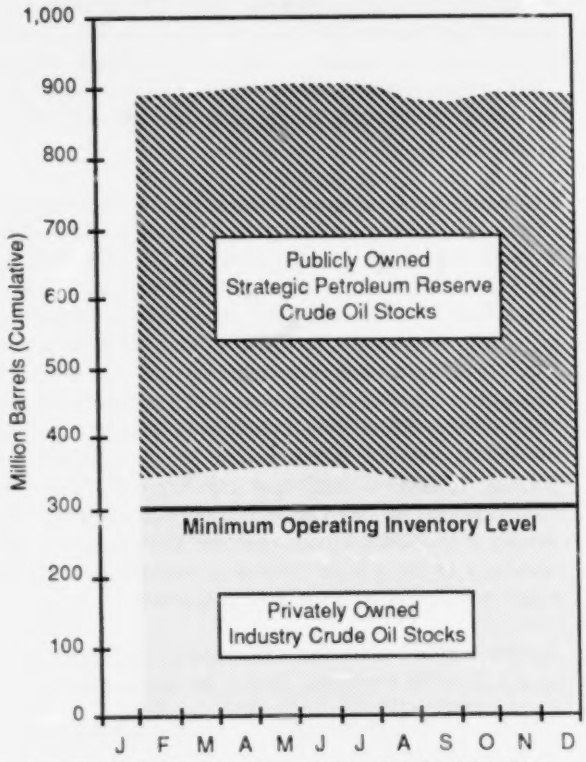
Seasonal drawdown of motor gasoline and distillate fuel oil stocks was offset somewhat by off-season stockbuilding of motor gasoline (colder months) and distillate fuel oils (warmer months) that were produced as coproducts while refineries operated at very high levels to satisfy product demand throughout the year. This offsetting stockbuild minimized the depletion of distillate fuel oil stocks and resulted in an overall

Figure FE3. Distillate Fuel Oil Stock Levels, 1988



Sources: Stock Levels -- Energy Information Administration, *Petroleum Supply Annual 1988*, Volume 1, Table S2; Minimum Operating Inventory -- National Petroleum Council, *Petroleum Storage and Transportation*, Volume 4, April 1989.

Figure FE4. Crude Oil Stock Levels, 1988



Sources: Stock Levels -- Energy Information Administration, *Petroleum Supply Annual 1988*, Volume 1, Table S5; Minimum Operating Inventory -- National Petroleum Council, *Petroleum Storage and Transportation*, Volume 4, April 1989.

stockbuild of motor gasoline despite near-record demand for both products.

Security Afforded by Current Petroleum Inventories

Privately owned industry crude oil stocks are currently maintained only slightly above estimated MOI levels. These minimum levels are used to gauge the sufficiency of stocks to maintain normal day-to-day operations. They do not provide for reserves to accommodate severe or long-term supply disruptions. Consequently, by themselves, current levels of privately owned industry stocks would afford little protection against a large, international supply disruption.

The U.S. Government is filling several artificially created reservoirs with crude oil. The stocks in these reservoirs are known collectively as the Strategic Petroleum Reserve (SPR). The SPR, in combination with privately owned industry crude oil stocks (Figure FE4), makes the U.S. crude oil emergency supply far more secure. It is the present goal of the U.S. Government to fill the SPR to a level of 750 million barrels. At the end of 1988, the SPR contained 560 million barrels and filling continues.

Refinery Capacity and Utilization

Crude oil distillation capacity is sometimes used as a general measure of the U.S. petroleum industry's ability to satisfy petroleum product demand by use of domestic processing facilities. Over the long term, refinery distillation capacity has generally increased or decreased in parallel with product demand levels. U.S. distillation capacity ordinarily trails demand, but an abrupt downturn and subsequent steep decline in demand from 1979 through 1983 resulted in excessive crude oil distillation capacity. This situation persisted until 1985 by which time crude oil distillation capacity had been reduced to a level slightly below product demand level, primarily by the closing of refineries.

The rate at which distillation capacity is utilized is a measure of the ability of U.S. refiners to meet short-term changes in petroleum product requirements. The utilization rate can also be used as a measure of efficient refinery operation. The rate of utilization can fluctuate widely because changes in petroleum product demand and the resulting changes in refinery operations occur more rapidly than changes in crude oil distillation capacity.

Crude oil distillation capacity was utilized at an average rate of more than 90 percent during the 30-year period from 1950 through 1979. This sustained high rate of utilization is a general benchmark for efficient levels of distillation capacity use. From 1980 through 1985, when distillation capacity exceeded petroleum product demand, the average distillation capacity utilization rate dropped to a less efficient 73 percent, as a large portion of distillation capacity remained idle. By 1987, refinery efficiency had improved as the annual average distillation capacity utilization rate had increased to 83.1 percent. Crude oil distillation capacity declined to 15.6 million barrels per day and petroleum product demand rose sharply to 16.7 million barrels per day. Consequently, it was necessary to use a larger portion of remaining distillation capacity to meet the higher level of demand.

In 1988, refinery utilization of distillation capacity increased to a rate of 84.4 percent despite an increase in average distillation capacity to 15.9 million barrels per day. The increased utilization was induced by wide refiner profit margins as heavy consumption helped firm product prices while crude oil costs declined due to OPEC overproduction. Some regions in PAD District II actually exceeded nameplate capacity during the months of peak motor gasoline consumption.

On the basis of the high-level utilization of distillation capacity that prevailed for so many years, it appears that the current U.S. distillation capacity could accommodate a substantial increase in petroleum product demand. However, according to the National Petroleum Council, motor gasoline output is constrained by limited capacity of downstream conversion and octane-enhancement facilities.[15] According to a 1986 estimate by the National Petroleum Council, U.S. refiners would be limited to an estimated 6.7- to 6.8-million barrels per day output of motor gasoline.

Since the 1986 National Petroleum Council estimate, the addition of downstream processing capacity has apparently expanded the 6.8 million barrel-per-day maximum somewhat. However, 1988 average output of nearly 7.0 million barrels per day may be approaching the U.S. limit for motor gasoline production especially since output is now heavily weighted toward unleaded gasoline which poses special octane-enhancement requirements that limit refinery yields.

[15] National Petroleum Council, *U.S. Petroleum Refining*, (Washington, DC, October 1986).

Summary Statistics

Changes in Natural Gas Liquids and Crude Oil Statistics

Beginning in 1988, adjustments are being made to refinery inputs and product supplied of natural gas liquids (NGLs) and refinery inputs of crude oil to account for refiner misreporting. Substantial volumes of NGLs are produced at natural gas processing plants in Alaska and injected into the crude oil moving in the Trans Alaska Pipeline System (TAPS). Refiners receiving any crude oil commingled with NGLs are instructed to report the NGL portion of that stream separately from the crude oil portion. This has not been done for Alaskan crude oil because refiners are unable to identify these volumes for accounting purposes. As a result, the NGL production in Alaska has been credited directly toward product supplied and also toward product supplied from refinery production when the refiner processes the crude oil-NGL mixture. In addition, the reporting of the commingled stream as crude oil by the refiner has overstated crude oil inputs and resulted in an increase in unaccounted for crude oil equal to the volume of NGL in the crude oil.

To offset this reporting error, an adjustment is being made to refinery input in all PAD Districts receiving Alaskan crude oil. The adjustment reduces the crude oil inputs and increases the NGL inputs by an equal amount. Each PAD District adjustment is a portion of the known Alaskan NGL production that is proportional to the PAD District's share of Alaskan crude oil received at all refineries in the United States. The greatest impact occurs in PAD District V for butane and pentanes plus.

The reporting problem began in 1987 and has grown as injections of NGLs into the TAPS have increased. Revisions for 1987 data are not planned.

Table S1. Crude Oil[1] and Petroleum Products Overview

	Field Production			Stock Withdrawal[2]		Petroleum Products Supplied	Ending Stocks[3]
	Total Domestic[4]	Crude Oil	Natural Gas Plant Liquids	Crude Oil[5]	Petroleum Products		Crude Oil[5] and Petroleum Products
	Thousand Barrels per Day						Million Barrels
1973 **Average**	**10,975**	**9,208**	**1,738**	**11**	**-146**	**17,308**	**1,008**
1974 **Average**	**10,498**	**8,774**	**1,688**	**-62**	**-117**	**16,653**	**[8] 1,074**
1975 **Average**	**10,045**	**8,375**	**1,633**	**[8] -17**	**[8] -15**	**16 322**	**1,133**
1976 **Average**	**9,774**	**8,132**	**1,603**	**-39**	**96**	**17,461**	**1,112**
1977 **Average**	**9,913**	**8,245**	**1,618**	**-170**	**-378**	**18,431**	**1,312**
1978 **Average**	**10,328**	**8,707**	**1,567**	**-78**	**172**	**18,847**	**1,278**
1979 **Average**	**10,179**	**8,552**	**1,584**	**-148**	**-25**	**18,513**	**1,341**
1980 **Average**	**10,214**	**8,597**	**1,573**	**-98**	**-42**	**17,056**	**[8] 1,392**
1981 **Average**	**10,230**	**8,572**	**1,609**	**[8] -290**	**[8] 130**	**16,058**	**[8] 1,484**
1982 **Average**	**10,252**	**8,649**	**1,550**	**-136**	**283**	**15,296**	**[8] 1,430**
1983 **Average**	**10,299**	**8,688**	**1,559**	**[8] -214**	**[8] 234**	**15,231**	**1,454**
1984 **Average**	**10,554**	**8,879**	**1,630**	**-199**	**-81**	**15,726**	**1,556**
1985 **Average**	**10,636**	**8,971**	**1,609**	**-50**	**153**	**15,726**	**1,519**
1986 January	10,911	9,137	1,711	-383	-151	16,088	1,535
February	10,916	9,173	1,690	-37	804	16,186	1,514
March	10,664	9,013	1,804	-345	1,160	16,276	1,489
April	10,435	8,864	1,529	41	262	15,945	1,479
May	10,440	8,838	1,542	260	-1,109	15,993	1,506
June	10,187	8,623	1,504	3	-1,238	16,049	1,543
July	10,225	8,660	1,507	-541	-422	16,307	1,573
August	9,875	8,374	1,445	242	-551	16,818	1,582
September	9,852	8,328	1,468	-217	-973	15,909	1,618
October	9,954	8,419	1,477	-233	476	16,602	1,610
November	10,061	8,412	1,569	95	-147	16,221	1,612
December	9,985	8,352	1,571	186	443	17,131	1,593
Average	**10,289**	**8,880**	**1,551**	**-78**	**-124**	**16,281**	--
1987 January	10,139	8,480	1,582	-166	376	16,684	1,586
February	10,075	8,389	1,618	-22	831	16,908	1,563
March	10,131	8,464	1,598	-125	340	16,165	1,557
April	10,139	8,498	1,590	50	532	16,524	1,539
May	9,977	8,336	1,585	36	-116	16,026	1,542
June	9,906	8,279	1,578	-165	-42	16,830	1,548
July	9,895	8,251	1,582	33	-372	17,113	1,558
August	9,843	8,210	1,571	-345	-737	16,348	1,592
September	9,851	8,205	1,582	-220	-235	16,670	1,606
October	10,037	8,364	1,602	-661	523	16,941	1,610
November	10,112	8,397	1,637	-355	-478	16,343	1,635
December	10,001	8,318	1,621	405	482	17,445	1,607
Average	**10,008**	**8,349**	**1,595**	**-128**	**87**	**16,665**	--
1988 January	9,876	8,250	1,579	43	294	17,403	1,597
February	10,018	8,374	1,605	-133	868	17,760	1,576
March	10,071	8,374	1,636	-219	748	17,612	1,559
April	9,946	8,288	1,618	-190	-445	16,561	1,578
May	9,899	8,229	1,627	-96	-1,048	16,197	1,614
June	9,834	8,170	1,616	-43	109	17,059	1,612
July	9,713	8,040	1,618	261	-819	16,695	1,629
August	9,762	8,079	1,616	488	-307	17,482	1,624
September	9,575	7,895	1,621	83	-245	17,072	1,628
October	9,737	8,023	1,661	-399	333	17,580	1,630
November	9,751	8,023	1,666	-3	-25	17,620	1,631
December	9,641	7,942	1,634	188	911	18,365	1,597
Average	**9,818**	**8,140**	**1,625**	**-1**	**29**	**17,283**	--

1 Includes lease condensate.
2 A negative number indicates an increase in stocks and a positive number indicates a decrease.
3 Stocks are totals as of end of period.
4 Includes crude oil, natural gas plant liquids, other hydrocarbons, and alcohol.
5 Includes stocks located in the Strategic Petroleum Reserve.
6 Includes crude oil for storage in the Strategic Petroleum Reserve.
7 Net Imports equal Imports minus Exports.
8 In January 1975, 1981, and 1983, numerous respondents were added to surveys affecting stocks reported and stock withdrawal calculations. See Explanatory Note 8.

Footnotes continued on following page.

Table S1. Crude Oil[1] and Petroleum Products Overview (Continued)

	Imports			Exports			
	Total	Crude Oil[6]	Petroleum Products	Total	Crude Oil	Petroleum Products	Net Imports[7]
	Thousand Barrels per Day						
1973 Average	**6,256**	**3,244**	**3,012**	**231**	**2**	**229**	**6,025**
1974 Average	**6,112**	**3,477**	**2,635**	**221**	**3**	**218**	**5,892**
1975 Average	**6,056**	**4,105**	**1,951**	**209**	**6**	**204**	**5,846**
1976 Average	**7,313**	**5,287**	**2,026**	**223**	**8**	**215**	**7,090**
1977 Average	**8,807**	**6,615**	**2,193**	**243**	**50**	**193**	**8,565**
1978 Average	**8,363**	**6,356**	**2,008**	**362**	**158**	**204**	**8,002**
1979 Average	**8,456**	**6,519**	**1,937**	**472**	**235**	**237**	**7,984**
1980 Average	**6,909**	**5,263**	**1,646**	**544**	**287**	**258**	**6,365**
1981 Average	**5,996**	**4,396**	**1,599**	**595**	**228**	**367**	**5,401**
1982 Average	**5,113**	**3,488**	**1,625**	**815**	**236**	**579**	**4,298**
1983 Average	**5,051**	**3,329**	**1,722**	**739**	**164**	**575**	**4,312**
1984 Average	**5,437**	**3,426**	**2,011**	**722**	**181**	**541**	**4,715**
1985 Average	**5,067**	**3,201**	**1,866**	**781**	**204**	**577**	**4,286**
1986 January	5,573	3,472	2,101	859	159	700	4,714
February	4,676	2,968	1,709	876	162	715	3,800
March	4,712	2,988	1,724	732	212	520	3,980
April	5,439	3,684	1,755	850	94	756	4,589
May	6,400	4,250	2,150	724	98	625	5,676
June	6,848	4,635	2,213	642	240	401	6,206
July	6,942	4,726	2,216	685	65	620	6,256
August	7,168	4,859	2,309	868	233	635	6,300
September	7,090	5,031	2,059	714	161	553	6,375
October	6,427	4,419	2,008	831	151	680	5,597
November	6,592	4,615	1,977	821	115	706	5,771
December	6,700	4,412	2,288	820	159	661	5,881
Average	**6,224**	**4,178**	**2,047**	**785**	**154**	**631**	**5,439**
1987 January	6,353	4,385	1,968	703	84	619	5,650
February	5,984	3,866	2,118	977	284	694	5,007
March	5,794	3,779	2,015	720	150	570	5,074
April	5,911	4,132	1,779	870	247	624	5,041
May	6,073	4,340	1,732	666	69	597	5,407
June	6,763	4,807	1,962	669	116	554	6,099
July	7,588	5,295	2,293	680	149	531	6,908
August	7,454	5,510	1,944	664	141	523	6,790
September	7,178	5,110	2,068	795	116	680	6,382
October	7,068	5,142	1,926	646	84	562	6,422
November	7,068	5,013	2,055	737	164	573	6,331
December	6,833	4,640	2,194	1,057	220	838	5,776
Average	**6,678**	**4,674**	**2,004**	**764**	**151**	**613**	**5,914**
1988 January	7,181	4,662	2,519	885	206	679	6,296
February	7,256	4,650	2,605	864	146	718	6,392
March	6,944	4,868	2,076	834	213	622	6,110
April	7,270	5,167	2,103	676	114	562	6,594
May	7,469	5,339	2,130	814	138	676	6,655
June	7,239	5,322	1,917	938	138	800	6,301
July	7,297	5,100	2,197	826	186	640	6,471
August	7,386	5,089	2,296	814	152	661	6,572
September	7,506	5,212	2,294	673	119	554	6,833
October	7,830	5,551	2,279	732	166	566	7,098
November	7,714	5,070	2,644	717	148	569	6,997
December	7,727	5,230	2,497	1,008	129	879	6,719
Average	**7,402**	**5,107**	**2,295**	**815**	**155**	**661**	**6,587**

Footnotes continued.

(s) = Less than 500 barrels per day.

Notes: • Geographic coverage is the 50 States and the District of Columbia. • Totals may not equal sum of components due to independent rounding.

Source: See the last page of this section.

Figure S1. Petroleum Overview

(Thousand Barrels per Day)

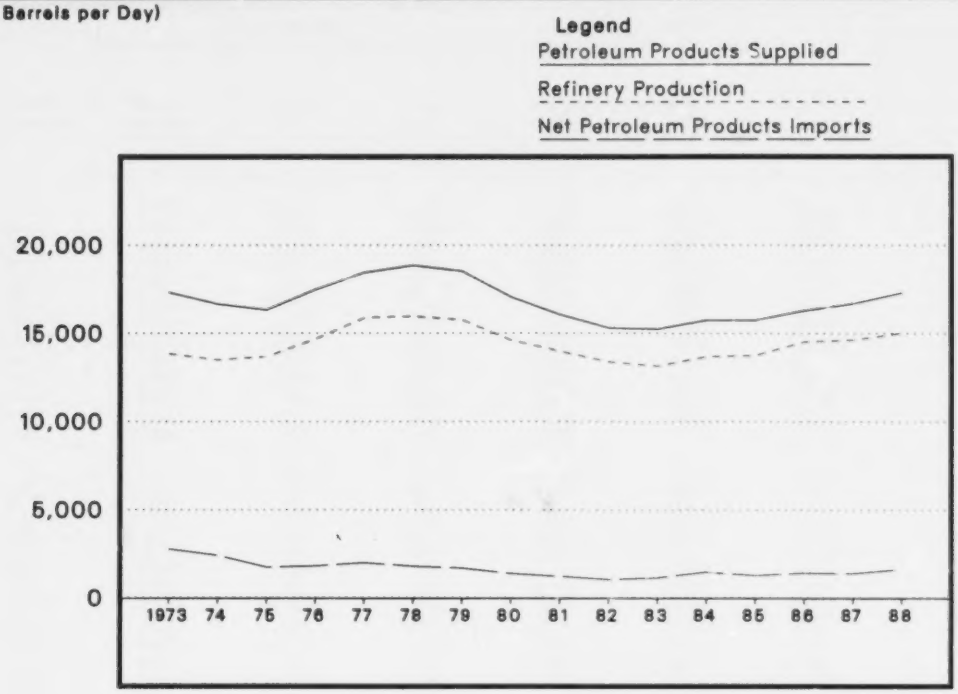


Figure S2. Petroleum Products Supplied

(Thousand Barrels per Day)

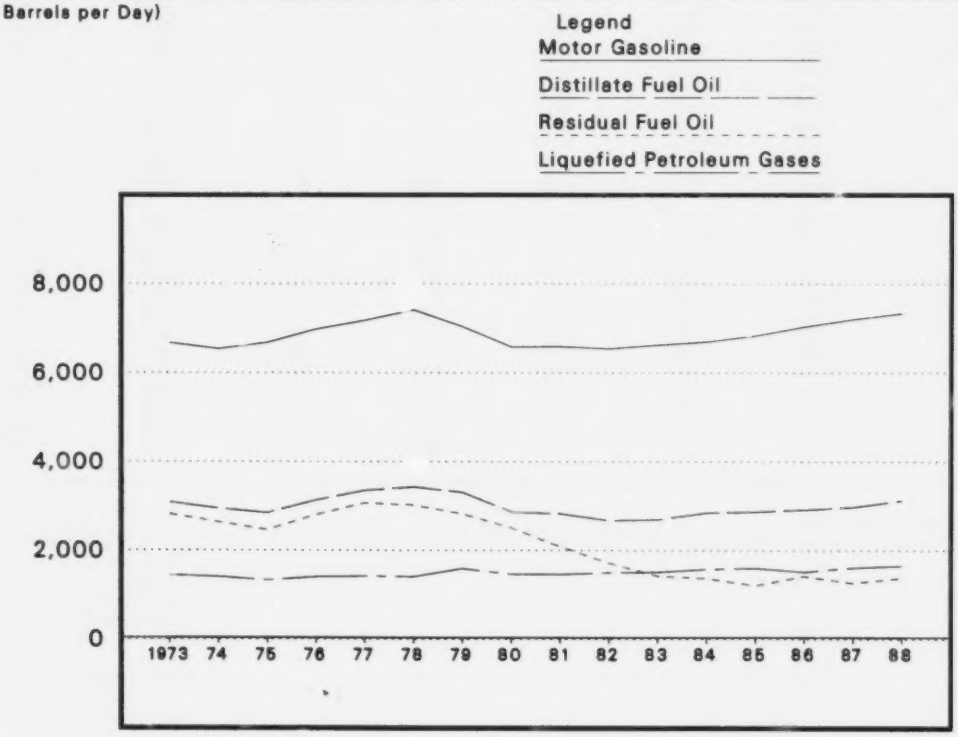


Figure S3. Crude Oil Supply and Disposition

(Thousand Barrels per Day)

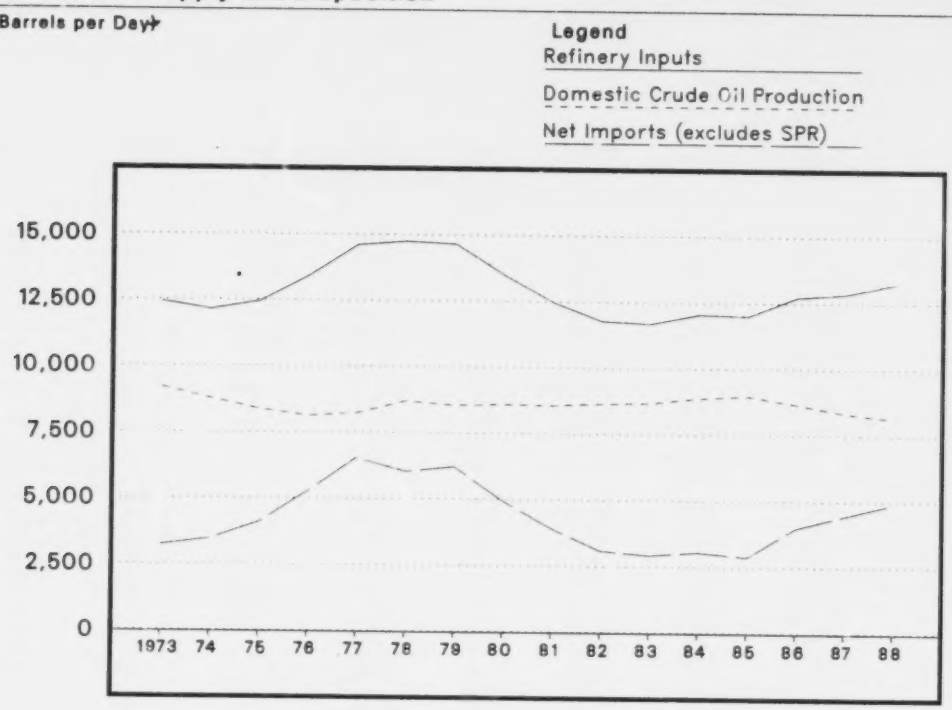


Figure S4. Crude Oil Ending Stocks

(Million Barrels)

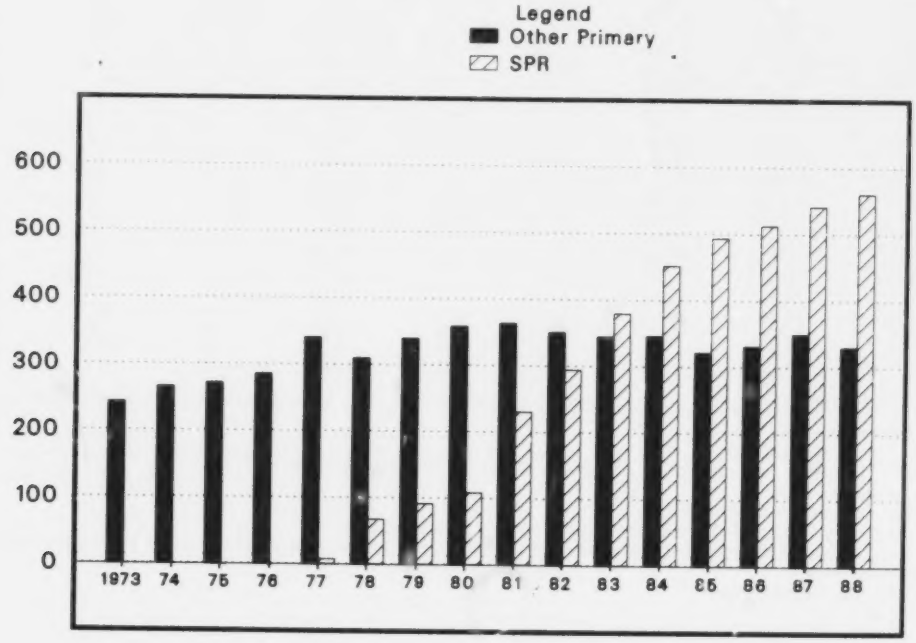


Table S2. Crude Oil[1] Supply and Disposition

		Supply							
		Field Production		Imports			Stock Withdrawal[3]		
		Total Domestic	Alaskan	Total	SPR[4]	Other	SPR[4]	Other	Unaccounted for Crude Oil[5]
		Thousand Barrels per Day							
1973	**Average**	**9,208**	**198**	**3,244**	**--**	**3,244**	**--**	**11**	**3**
1974	**Average**	**8,774**	**193**	**3,477**	**--**	**3,477**	**--**	**-62**	**-25**
1975	**Average**	**8,375**	**191**	**4,105**	**--**	**4,105**	**--**	**-17**	**17**
1976	**Average**	**8,132**	**173**	**5,287**	**--**	**5,287**	**--**	**-39**	**77**
1977	**Average**	**8,245**	**464**	**6,615**	**21**	**6,594**	**-20**	**-150**	**-6**
1978	**Average**	**8,707**	**1,229**	**6,356**	**162**	**6,195**	**-163**	**84**	**-57**
1979	**Average**	**8,552**	**1,401**	**6,519**	**67**	**6,452**	**-67**	**-81**	**-11**
1980	**Average**	**8,597**	**1,617**	**5,263**	**44**	**5,219**	**-45**	**-52**	**34**
1981	**Average**	**8,572**	**1,609**	**4,396**	**256**	**4,141**	**-336**	**[7] 46**	**83**
1982	**Average**	**8,649**	**1,695**	**3,488**	**165**	**3,323**	**-174**	**38**	**71**
1983	**Average**	**8,688**	**1,714**	**3,329**	**234**	**3,096**	**-234**	**[7] 20**	**114**
1984	**Average**	**8,879**	**1,722**	**3,426**	**197**	**3,229**	**-195**	**-4**	**185**
1985	**Average**	**8,971**	**1,825**	**3,201**	**118**	**3,083**	**-117**	**67**	**145**
1986	January	9,137	1,870	3,472	51	3,420	-35	-348	364
	February	9,173	1,907	2,968	24	2,944	-35	-2	32
	March	9,013	1,860	2,988	59	2,929	-49	-296	259
	April	8,864	1,836	3,684	63	3,621	-63	104	70
	May	8,838	1,927	4,250	36	4,215	-35	295	79
	June	8,623	1,887	4,635	64	4,571	-64	66	292
	July	8,660	1,903	4,726	52	4,674	-52	-489	189
	August	8,374	1,811	4,859	51	4,809	-51	293	93
	September	8,328	1,782	5,031	47	4,984	-47	-170	161
	October	8,419	1,927	4,419	37	4,382	-36	-197	223
	November	8,412	1,883	4,615	45	4,570	-65	160	-136
	December	8,352	1,807	4,412	48	4,365	-68	254	28
	Average	**8,680**	**1,867**	**4,178**	**48**	**4,130**	**-50**	**-28**	**139**
1987	January	8,480	2,019	4,385	92	4,293	-108	-58	-5
	February	8,389	1,853	3,866	44	3,822	-64	42	382
	March	8,464	1,968	3,779	95	3,684	-106	-19	151
	April	8,498	1,990	4,132	57	4,076	-67	116	120
	May	8,336	1,979	4,340	92	4,248	-101	137	51
	June	8,279	1,930	4,807	64	4,743	-69	-97	434
	July	8,251	1,910	5,295	76	5,218	-91	124	32
	August	8,210	1,908	5,510	63	5,447	-63	-281	177
	September	8,205	1,874	5,110	64	5,047	-64	-157	217
	October	8,364	1,986	5,142	57	5,085	-57	-604	-3
	November	8,397	2,068	5,013	97	4,916	-97	-258	115
	December	8,318	2,043	4,640	68	4,572	-68	472	101
	Average	**8,349**	**1,962**	**4,674**	**73**	**4,601**	**-80**	**-49**	**145**
1988	January	8,250	1,999	4,662	67	4,595	-67	110	216
	February	8,374	2,070	4,650	49	4,601	-49	-84	-50
	March	8,374	2,086	4,868	23	4,845	-26	-193	258
	April	8,288	2,029	5,167	78	5,090	-77	-112	27
	May	8,229	2,016	5,339	22	5,317	-22	-74	125
	June	8,170	1,984	5,322	70	5,252	-70	27	207
	July	8,040	1,960	5,100	42	5,058	-42	302	432
	August	8,079	2,009	5,089	26	5,064	-26	514	278
	September	7,895	2,019	5,212	84	5,128	-84	167	228
	October	8,023	2,010	5,551	43	5,508	-43	-356	160
	November	8,023	2,027	5,070	89	4,981	-89	86	258
	December	7,942	1,996	5,230	27	5,203	-27	215	196
	Average	**8,140**	**2,017**	**5,107**	**51**	**5,055**	**-52**	**51**	**196**

1 Includes lease condensate.
2 Stocks are totals as of end of period.
3 A negative number indicates an increase in stocks and a positive number indicates a decrease.
4 Strategic Petroleum Reserve.
5 Unaccounted for crude oil is a balancing item.
6 Beginning in January 1983, crude oil used directly as fuel is shown as product supplied.
7 Stocks of Alaskan crude oil in transit were included beginning in January 1981. Stock withdrawals are calculated using new basis stock levels.

See Explanatory Notes 8 and 9.

Footnotes continued on following page.

Table S2. Crude Oil[1] Supply and Disposition (Continued)

		Supply	Disposition				Ending Stocks[2]		
		Crude Used Directly[6]	Crude Losses	Refinery Inputs	Exports	Product Supplied[6]	Total	SPR[4]	Other Primary
		Thousand Barrels per Day					Million Barrels		
1973	Average	-19	13	12,431	2	--	242	--	242
1974	Average	-15	13	12,133	3	--	265	--	265
1975	Average	-17	13	12,442	6	--	271	--	271
1976	Average	-18	15	13,416	8	--	285	--	285
1977	Average	-14	16	14,602	50	--	348	7	340
1978	Average	-14	16	14,739	158	--	376	67	309
1979	Average	-13	16	14,648	235	--	430	91	339
1980	Average	-13	15	13,481	287	--	[7] 466	108	[7] 358
1981	Average	-58	5	12,470	228	--	594	230	363
1982	Average	-59	3	11,774	236	--	[7] 644	294	[7] 350
1983	Average	--	2	11,685	164	66	723	379	344
1984	Average	--	2	12,044	181	64	796	451	345
1985	Average	--	1	12,002	204	60	814	493	321
1986	January	--	1	12,374	159	57	826	494	332
	February	--	(s)	11,918	162	56	827	495	332
	March	--	(s)	11,652	212	52	838	497	341
	April	--	(s)	12,512	94	54	837	499	338
	May	--	(s)	13,279	98	49	829	500	329
	June	--	(s)	13,261	240	52	828	502	327
	July	--	(s)	12,917	65	51	845	503	342
	August	--	(s)	13,287	233	48	838	505	333
	September	--	(s)	13,097	161	45	844	506	338
	October	--	(s)	12,636	151	41	851	508	344
	November	--	(s)	12,831	115	41	849	509	339
	December	--	(s)	12,777	159	42	843	512	331
	Average	--	(s)	12,716	154	49	--	--	--
1987	January	--	1	12,570	84	41	848	515	333
	February	--	(s)	12,290	284	41	849	517	332
	March	--	1	12,081	150	39	852	520	332
	April	--	(s)	12,512	247	41	851	522	329
	May	--	(s)	12,653	69	42	850	525	325
	June	--	(s)	13,202	116	36	855	527	328
	July	--	(s)	13,430	149	32	854	530	324
	August	--	(s)	13,380	141	31	864	532	332
	September	--	(s)	13,168	116	28	871	534	337
	October	--	(s)	12,733	84	25	892	536	356
	November	--	(s)	12,981	164	25	902	539	364
	December	--	(s)	13,212	220	31	890	541	349
	Average	--	(s)	12,854	151	34	--	--	--
1988	January	--	(s)	12,920	206	45	888	543	346
	February	--	(s)	12,644	146	52	892	544	348
	March	--	(s)	13,016	213	52	899	545	354
	April	--	(s)	13,135	114	42	905	547	357
	May	--	(s)	13,425	138	34	908	548	360
	June	--	(s)	13,487	138	32	909	550	359
	July	--	1	13,617	186	29	901	551	349
	August	--	(s)	13,752	152	30	886	552	334
	September	--	(s)	13,261	119	37	883	555	329
	October	--	(s)	13,126	166	42	896	556	340
	November	--	(s)	13,156	148	44	896	559	337
	December	--	(s)	13,381	129	44	890	560	330
	Average	--	(s)	13,246	155	40	--	--	--

Footnotes continued.

(s) = Less than 500 barrels per day.

Notes: • Geographic coverage is the 50 States and the District of Columbia. • Totals may not equal sum of components due to independent rounding.

Source: See the last page of this section.

Table S3. Crude Oil and Petroleum Product Imports

		Imports from OPEC Sources[1]										
		Algeria	Libya	Saudi Arabia[2]	United Arab Emirates	Indonesia	Iran	Nigeria	Venezuela	Other OPEC[2]	Total OPEC[3]	Total Arab OPEC[4]
		Thousand Barrels per Day										
1973	**Average**	136	164	486	71	213	223	459	1,135	106	2,993	915
1974	**Average**	190	4	461	74	300	469	713	979	88	3,280	752
1975	**Average**	282	232	715	117	390	280	762	702	122	3,601	1,383
1976	**Average**	432	453	1,230	254	539	298	1,025	700	134	5,066	2,424
1977	**Average**	559	723	1,380	335	541	535	1,143	690	287	6,193	3,185
1978	**Average**	649	654	1,144	385	573	555	919	645	226	5,751	2,963
1979	**Average**	636	658	1,356	281	420	304	1,080	690	212	5,637	3,056
1980	**Average**	488	554	1,261	172	348	9	857	481	130	4,300	2,551
1981	**Average**	311	319	1,129	81	366	0	620	406	90	3,323	1,848
1982	**Average**	170	26	552	92	248	35	514	412	97	2,146	854
1983	**Average**	240	0	337	30	338	48	302	422	144	1,862	632
1984	**Average**	323	1	325	117	343	10	216	548	166	2,049	819
1985	**Average**	187	4	168	45	314	27	293	605	187	1,830	472
1986	January	215	0	664	11	290	0	278	629	210	2,298	976
	February	157	0	574	0	290	(s)	204	518	64	1,807	757
	March	260	0	482	0	161	0	328	797	117	2,145	798
	April	275	0	698	21	292	0	319	831	139	2,576	1,058
	May	193	0	574	40	314	40	398	899	290	2,749	966
	June	319	0	662	83	353	0	382	772	439	3,010	1,377
	July	310	0	738	59	532	66	542	730	330	3,307	1,357
	August	363	0	680	37	274	93	606	916	378	3,346	1,339
	September	245	0	810	62	341	31	684	856	356	3,383	1,388
	October	305	0	697	147	388	0	530	863	346	3,276	1,387
	November	311	0	868	34	335	0	483	843	214	3,088	1,295
	December	291	0	769	30	251	0	511	841	284	2,976	1,223
	Average	271	0	685	44	318	19	440	793	265	2,837	1,162
1987	January	156	0	875	15	254	0	346	899	218	2,764	1,184
	February	307	0	776	54	418	30	256	791	155	2,785	1,222
	March	334	0	430	0	317	73	312	702	135	2,305	843
	April	323	0	463	62	236	47	512	710	77	2,430	866
	May	196	0	499	26	297	75	550	913	119	2,675	775
	June	247	0	782	45	261	165	546	808	268	3,122	1,275
	July	347	0	756	42	349	237	792	854	157	3,533	1,264
	August	250	0	961	103	312	208	732	831	351	3,748	1,611
	September	378	0	902	146	242	193	615	821	263	3,560	1,640
	October	274	0	1,051	111	305	86	518	829	401	3,576	1,713
	November	395	0	637	97	219	41	607	771	402	3,169	1,477
	December	339	0	876	31	216	23	613	717	220	3,033	1,415
	Average	295	0	751	61	285	98	535	804	231	3,060	1,274
1988	January	333	0	849	61	179	[5] 1	406	766	540	3,134	1,652
	February	358	0	1,265	79	194	0	506	846	214	3,461	1,883
	March	259	0	937	6	127	0	589	803	352	3,073	1,509
	April	342	0	929	48	166	0	711	833	385	3,413	1,610
	May	320	0	1,041	41	298	0	601	841	360	3,501	1,724
	June	262	0	923	11	184	0	875	850	527	3,632	1,635
	July	225	0	1,076	43	216	0	715	724	590	3,589	1,911
	August	257	0	1,169	0	153	0	623	830	669	3,703	2,036
	September	289	0	1,066	22	242	0	546	824	697	3,685	2,042
	October	326	0	1,244	16	265	0	686	772	552	3,861	2,069
	November	322	0	986	0	240	0	489	779	694	3,510	1,914
	December	312	0	1,289	19	194	0	667	669	524	3,674	2,080
	Average	300	0	1,064	29	205	(s)	618	794	510	3,520	1,839

[1] Excludes petroleum imported into the United States indirectly from members of the Organization of Petroleum Exporting Countries (OPEC), primarily from Caribbean and West European areas, as petroleum products that were refined from crude oil produced by OPEC.

[2] The other members of OPEC are Ecuador, Gabon, Iraq, Kuwait, and Qatar. Prior to January 1988, imports from the Neutral Zone between Kuwait and Saudi Arabia are included in imports from Saudi Arabia. From January 1988 forward, those imports are included in imports from "Other OPEC".

[3] "Total OPEC" consists of Ecuador, Gabon, Indonesia, Iran, Nigeria, and Venezuela, as well as the Arab members. Imports from the Neutral Zone between Kuwait and Saudi Arabia are included in imports from "Total OPEC".

[4] The Arab members of OPEC are Algeria, Iraq, Kuwait, Libya, Qatar, Saudi Arabia, and the United Arab Emirates.

[5] A small amount of Iranian crude oil entered the United States (defined in this publication as the 50 States and the District of Columbia) in January 1988 from the Virgin Islands. This oil originated in Iran and was exported to the Virgin Islands prior to the signing of Executive Order 12613 on October 29, 1987.

Footnotes continued on following page.

Table S3. Crude Oil and Petroleum Product Imports (Continued)

		Imports from Non-OPEC Sources[6]										
		Baha-mas	Canada	Mexico	Nether-lands Antilles	Trinidad and Tobago	United Kingdom	Puerto Rico	Virgin Islands	Other Non-OPEC	Total Non-OPEC	Total Imports
		Thousand Barrels per Day										
1973	**Average**	174	1,325	16	585	255	15	99	329	465	3,263	6,256
1974	**Average**	164	1,070	8	511	251	8	90	391	340	2,832	6,112
1975	**Average**	152	846	71	332	242	14	90	406	300	2,454	6,056
1976	**Average**	118	599	87	275	274	31	88	422	353	2,247	7,313
1977	**Average**	171	517	179	211	289	126	105	466	550	2,614	8,807
1978	**Average**	160	467	318	229	253	180	94	429	484	2,613	8,363
1979	**Average**	147	538	439	231	190	202	92	431	548	2,819	8,456
1980	**Average**	78	455	533	225	176	176	88	388	491	2,609	6,909
1981	**Average**	74	447	522	197	133	375	62	327	534	2,672	5,996
1982	**Average**	65	482	685	175	112	456	50	316	627	2,968	5,113
1983	**Average**	125	547	826	189	96	382	40	282	701	3,189	5,051
1984	**Average**	88	630	748	188	94	402	42	294	902	3,388	5,437
1985	**Average**	40	770	816	40	113	310	28	247	873	3,237	5,067
1986	January	62	823	681	58	108	333	21	326	862	3,275	5,573
	February	33	690	557	11	85	218	18	309	949	2,870	4,676
	March	18	750	616	27	79	178	25	186	688	2,567	4,712
	April	34	798	694	13	111	188	23	209	793	2,863	5,439
	May	32	881	743	37	130	365	27	237	1,199	3,651	6,400
	June	29	753	884	17	167	569	30	233	1,157	3,838	6,848
	July	44	763	850	25	131	353	29	237	1,202	3,634	6,942
	August	39	801	738	12	133	584	7	214	1,294	3,822	7,168
	September	15	801	615	17	162	437	23	291	1,345	3,706	7,090
	October	38	842	680	26	112	173	21	215	1,043	3,151	6,427
	November	39	960	565	53	129	448	21	179	1,111	3,504	6,592
	December	57	809	746	7	148	351	12	291	1,304	3,724	6,700
	Average	**37**	**807**	**699**	**25**	**125**	**350**	**21**	**244**	**1,080**	**3,387**	**6,224**
1987	January	59	799	689	29	100	384	33	327	1,170	3,589	6,353
	February	56	783	692	23	127	260	24	296	938	3,199	5,984
	March	43	738	721	14	124	322	17	247	1,262	3,489	5,794
	April	43	818	679	12	123	485	24	259	1,037	3,481	5,911
	May	31	884	541	33	117	392	21	214	1,164	3,398	6,073
	June	22	912	664	13	114	377	21	281	1,242	3,646	6,769
	July	46	901	680	71	98	354	17	288	1,598	4,055	7,588
	August	27	841	577	51	100	289	20	274	1,526	3,706	7,454
	September	48	846	705	42	105	259	25	271	1,318	3,618	7,178
	October	26	938	697	16	88	321	17	250	1,138	3,492	7,068
	November	31	827	627	14	111	456	15	235	1,585	3,899	7,068
	December	10	883	591	24	73	324	23	327	1,543	3,800	6,833
	Average	**37**	**848**	**655**	**29**	**106**	**352**	**21**	**272**	**1,296**	**3,617**	**6,678**
1988	January	51	959	808	40	97	313	29	341	1,410	4,047	7,181
	February	79	1,033	710	21	93	334	16	200	1,308	3,794	7,256
	March	47	1,002	745	46	89	461	22	180	1,280	3,871	6,944
	April	26	985	678	43	82	594	29	193	1,227	3,857	7,270
	May	24	1,001	722	27	102	389	20	257	1,426	3,968	7,469
	June	15	1,032	766	31	112	232	13	212	1,194	3,607	7,239
	July	15	972	723	35	96	214	22	215	1,416	3,708	7,297
	August	12	1,009	704	32	97	111	23	172	1,523	3,683	7,386
	September	37	936	843	25	96	149	29	236	1,469	3,820	7,506
	October	13	996	743	17	98	447	21	234	1,398	3,969	7,830
	November	27	1,080	811	72	80	246	15	286	1,587	4,204	7,714
	December	40	990	711	40	125	294	28	372	1,453	4,053	7,727
	Average	**32**	**999**	**747**	**36**	**97**	**315**	**22**	**242**	**1,392**	**3,882**	**7,402**

Footnotes continued.

[6] Includes petroleum imported into the United States indirectly from members of OPEC, primarily from Caribbean and West European areas, as petroleum products that were refined from crude oil produced by OPEC.

(s) = Less than 500 barrels per day.

Notes: • Beginning in October 1977, Strategic Petroleum Reserve imports are included. • Geographic coverage is the 50 States and the District of Columbia. • Totals may not equal sum of components due to independent rounding.

Source: See the last page of this section.

Figure S5. Finished Motor Gasoline Supply and Disposition

(Thousand Barrels per Day)

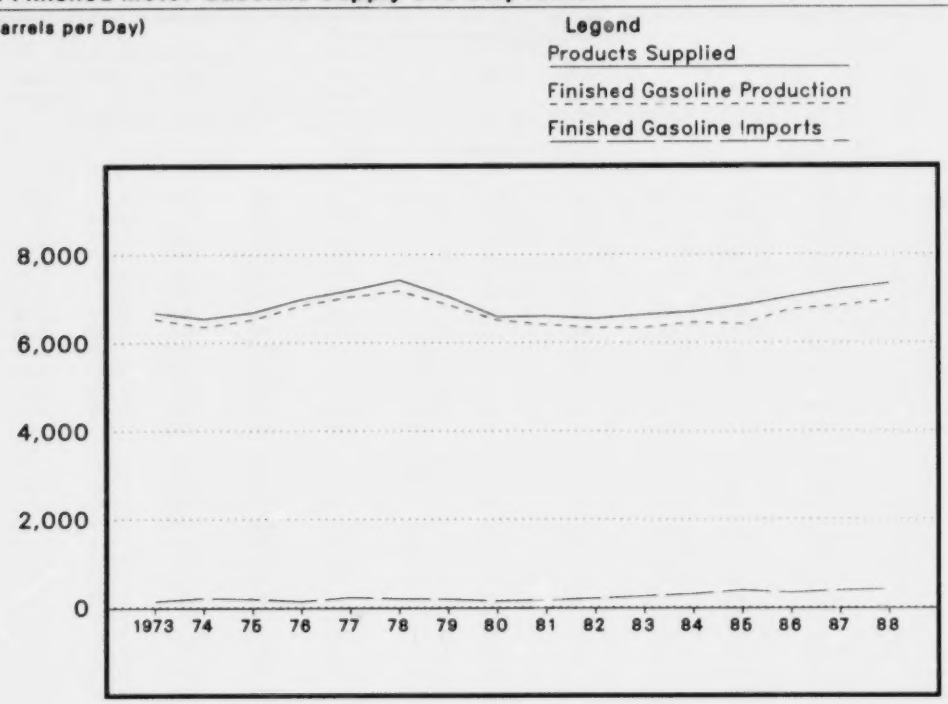
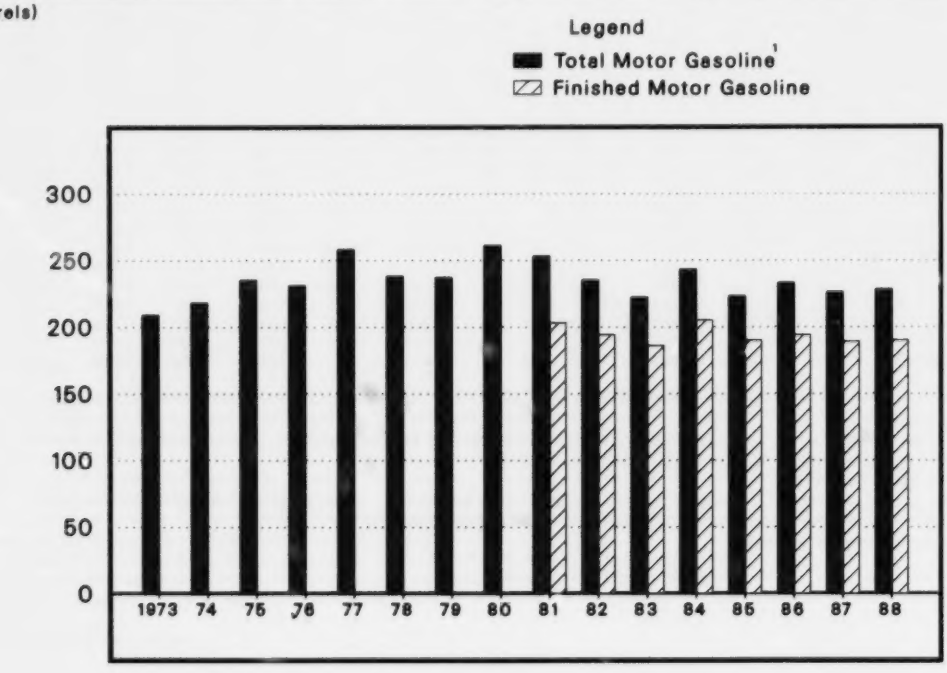


Figure S6. Motor Gasoline Ending Stocks

(Million Barrels)



[1]Includes finished motor gasoline and gasoline blending components.

Table S4. Finished Motor Gasoline Supply and Disposition

		Supply			Disposition				Ending Stocks[1]	
		Total Production	Imports[2]	Stock Withdrawal[2,3]	Exports	Product Supplied			Total Motor Gasoline[5]	Finished Motor Gasoline
						Total[4]	Unleaded	Unleaded		
		Thousand Barrels per Day						Percent of Total	Million Barrels	
1973	Average	6,535	134	9	4	6,674	--	--	209	--
1974	Average	6,360	204	-24	2	6,537	--	--	[6] 218	--
1975	Average	6,520	184	[6] -28	2	6,675	--	--	235	--
1976	Average	6,841	131	10	3	6,978	--	--	231	--
1977	Average	7,033	217	-72	2	7,177	1,976	27.5	258	--
1978	Average	7,169	190	54	1	7,412	2,521	34.0	238	--
1979	Average	6,852	181	2	(s)	7,034	2,798	39.8	237	--
1980	Average	6,506	140	-66	1	6,579	3,067	46.6	[6] 261	--
1981	Average[7]	6,405	157	[6] 28	2	6,588	3,264	49.5	253	--
1982	Average	6,338	197	25	20	6,539	3,409	52.1	[6] 235	--
1983	Average	6,340	247	[6] 45	10	6,622	3,647	55.1	222	186
1984	Average	6,453	299	-54	6	6,693	3,987	59.6	243	205
1985	Average	6,419	381	41	10	6,831	4,406	64.5	223	190
1986	January	6,522	332	-347	6	6,502	4,404	67.7	238	201
	February	6,302	334	-156	11	6,469	4,365	67.5	244	205
	March	6,061	224	691	21	6,955	4,678	67.3	219	184
	April	6,198	291	338	23	7,105	4,783	67.3	207	174
	May	7,095	471	-450	9	7,106	4,729	66.5	221	188
	June	7,101	392	-265	18	7,209	4,914	68.2	230	196
	July	6,956	337	189	47	7,436	5,182	69.7	224	190
	August	7,092	303	83	43	7,435	5,138	69.1	222	187
	September	6,891	303	-289	40	6,864	4,813	70.1	234	196
	October	6,616	322	372	61	7,250	5,086	70.1	222	184
	November	6,895	280	-200	96	6,879	4,918	71.5	229	190
	December	6,970	320	-122	24	7,143	5,193	72.7	233	194
	Average	6,752	326	-11	33	7,034	4,854	69.0	--	--
1987	January	6,714	393	-528	44	6,535	4,822	73.8	251	211
	February	6,365	309	144	22	6,796	5,068	74.6	250	207
	March	6,589	364	51	20	6,964	5,193	74.6	248	205
	April	6,850	374	133	42	7,314	5,405	73.9	242	201
	May	6,991	354	164	48	7,460	5,569	74.7	235	196
	June	7,089	385	111	46	7,539	5,678	75.3	230	193
	July	7,043	452	119	33	7,581	5,740	75.7	226	189
	August	6,933	396	29	19	7,338	5,656	77.1	226	188
	September	6,921	421	-107	30	7,205	5,536	76.8	230	191
	October	6,668	356	302	21	7,305	5,636	77.1	218	182
	November	6,907	484	-208	32	7,151	5,589	78.2	225	188
	December	7,015	320	-24	59	7,251	5,715	78.8	226	189
	Average	6,841	384	15	35	7,206	5,470	75.9	--	--
1988	January	6,730	357	-387	8	6,693	5,395	80.6	240	201
	February	6,736	397	-75	18	7,039	5,607	79.7	241	203
	March	6,715	349	277	18	7,323	5,894	80.5	232	194
	April	6,907	399	142	18	7,430	5,991	80.6	227	190
	May	6,851	437	43	28	7,303	5,861	80.3	226	189
	June	6,983	428	465	59	7,817	6,336	81.1	210	175
	July	7,159	482	-148	12	7,482	6,144	82.1	215	179
	August	7,209	494	-131	15	7,556	6,232	82.5	220	184
	September	6,948	443	28	16	7,404	6,115	82.6	221	183
	October	6,858	352	75	13	7,271	5,988	82.4	218	180
	November	7,060	451	-118	15	7,379	6,157	83.4	221	184
	December	7,303	277	-192	45	7,344	6,220	84.7	228	190
	Average	6,956	405	-3	22	7,336	5,995	81.7	--	--

[1] Stocks are totals as of end of period.
[2] Beginning in 1981, excludes blending components.
[3] A negative number indicates an increase in stocks and a positive number indicates a decrease.
[4] Includes gasohol.
[5] Includes motor gasoline blending components.
[6] In January 1975, 1981, and 1983, numerous respondents were added to surveys affecting stocks reported and stock withdrawal calculations. See Explanatory Note 8.
[7] Beginning in January 1981, survey forms were modified. See Explanatory Note 10.

(s) = Less than 500 barrels per day.

Notes: • Geographic coverage is the 50 States and the District of Columbia. • Totals may not equal sum of components due to independent rounding.

Source: See the last page of this section.

Figure S7. Distillate Fuel Oil Supply and Disposition

(Thousand Barrels per Day)

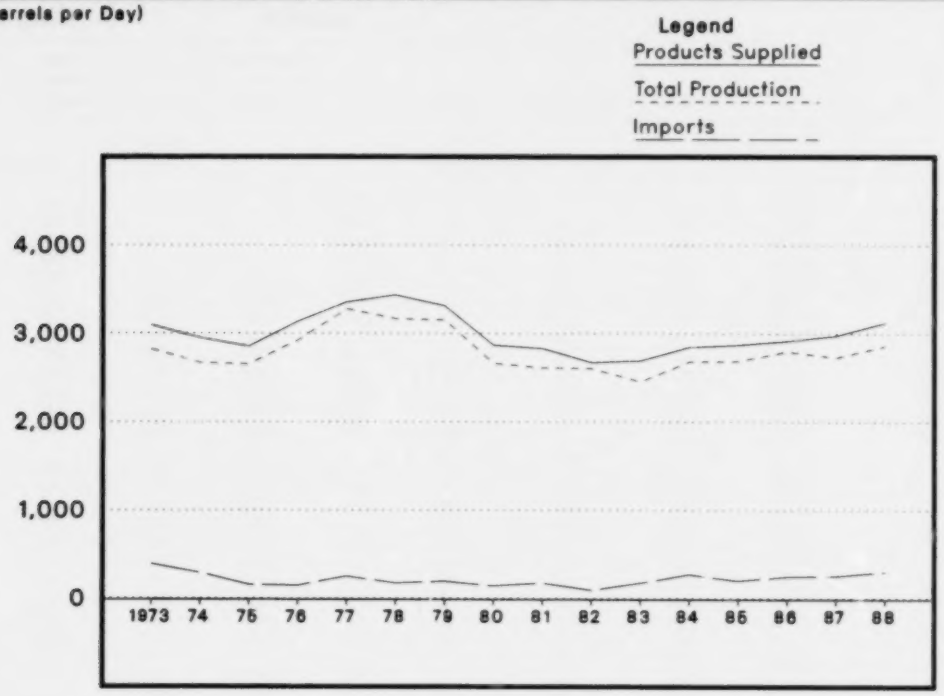


Figure S8. Distillate Fuel Oil Ending Stocks

(Million Barrels)

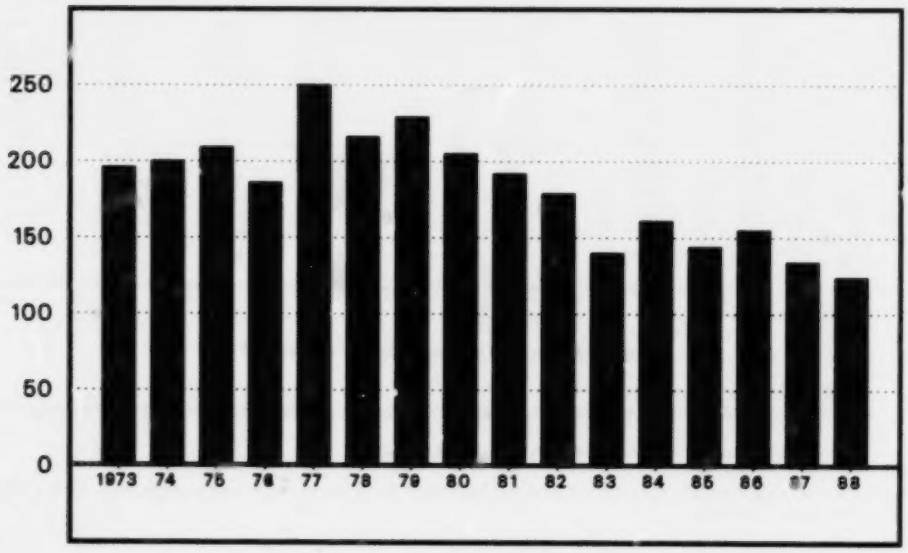


Table S5. Distillate Fuel Oil Supply and Disposition

		Supply				Disposition		
		Total Production	Imports	Stock Withdrawal[1]	Crude Used Directly[2]	Exports	Product Supplied[2]	Ending Stocks[3]
		Thousand Barrels per Day						Million Barrels
1973	**Average**	**2,822**	**392**	**-115**	**2**	**9**	**3,092**	**196**
1974	**Average**	**2,669**	**289**	**-9**	**2**	**2**	**2,948**	**[4] 200**
1975	**Average**	**2,654**	**155**	**[4] 40**	**2**	**1**	**2,851**	**209**
1976	**Average**	**2,924**	**146**	**62**	**1**	**1**	**3,133**	**186**
1977	**Average**	**3,278**	**250**	**-176**	**1**	**1**	**3,352**	**250**
1978	**Average**	**3,167**	**173**	**93**	**1**	**3**	**3,432**	**218**
1979	**Average**	**3,153**	**193**	**-34**	**1**	**3**	**3,311**	**229**
1980	**Average**	**2,662**	**142**	**[4] 64**	**1**	**3**	**2,866**	**[4] 205**
1981	**Average[5]**	**2,613**	**173**	**[4] 38**	**10**	**5**	**2,829**	**192**
1982	**Average**	**2,606**	**93**	**[4] 35**	**10**	**74**	**2,671**	**[4] 179**
1983	**Average**	**2,456**	**174**	**[4] 124**	**--**	**64**	**2,690**	**140**
1984	**Average**	**2,681**	**272**	**-57**	**--**	**51**	**2,845**	**161**
1985	**Average**	**2,687**	**200**	**48**	**--**	**67**	**2,868**	**144**
1986	January	2,699	325	232	--	126	3,330	136
	February	2,563	169	860	--	176	3,416	112
	March	2,643	217	438	--	131	3,168	99
	April	2,788	147	97	--	128	2,904	96
	May	2,858	149	-95	--	149	2,762	99
	June	2,729	169	-301	--	53	2,544	108
	July	2,710	313	-355	--	75	2,592	119
	August	2,922	370	-607	--	64	2,621	138
	September	2,865	262	-489	--	98	2,540	152
	October	2,717	243	25	--	74	2,912	152
	November	2,917	254	-222	--	72	2,877	158
	December	2,943	339	102	--	55	3,329	155
	Average	**2,798**	**247**	**-31**	**--**	**100**	**2,914**	**--**
1987	January	2,759	222	444	--	115	3,310	141
	February	2,556	253	629	--	93	3,345	124
	March	2,421	297	464	--	67	3,116	109
	April	2,553	192	300	--	53	2,991	100
	May	2,563	203	-31	--	51	2,684	101
	June	2,689	265	-104	--	61	2,790	104
	July	2,700	381	-329	--	38	2,713	115
	August	2,706	222	-327	--	47	2,553	125
	September	2,748	222	-68	--	64	2,838	127
	October	2,780	237	187	--	53	3,151	121
	November	3,035	187	-234	--	56	2,932	128
	December	3,242	378	-209	--	92	3,318	134
	Average	**2,731**	**255**	**56**	**--**	**66**	**2,976**	**--**
1988	January	3,010	424	206	--	82	3,558	128
	February	2,667	383	614	--	107	3,557	110
	March	2,706	247	660	--	74	3,539	90
	April	2,867	210	-171	--	42	2,864	95
	May	2,936	253	-320	--	74	2,795	105
	June	2,893	222	-185	--	76	2,854	110
	July	2,784	222	-308	--	58	2,640	120
	August	2,848	279	-185	--	70	2,873	126
	September	2,778	307	-192	--	72	2,821	131
	October	2,827	336	103	--	48	3,218	128
	November	2,909	327	-19	--	34	3,183	129
	December	3,068	409	171	--	87	3,560	124
	Average	**2,859**	**302**	**30**	**--**	**69**	**3,122**	**--**

[1] A negative number indicates an increase in stocks and a positive number indicates a decrease.
[2] Beginning in January 1983, product supplied for distillate fuel oil does not include crude oil used directly. See Explanatory Note 4.
[3] Stocks are totals as of end of period.
[4] In January 1975, 1981, and 1983, numerous respondents were added to surveys affecting stocks reported and stock withdrawal calculations. See Explanatory Note 8.
[5] Beginning in January 1981, survey forms were modified. See Explanatory Note 10.

Notes: • Geographic coverage is the 50 States and the District of Columbia. • Totals may not equal sum of components due to independent rounding.

Source: See the last page of this section.

Figure S9. Residual Fuel Oil Supply and Disposition

(Thousand Barrels per Day)

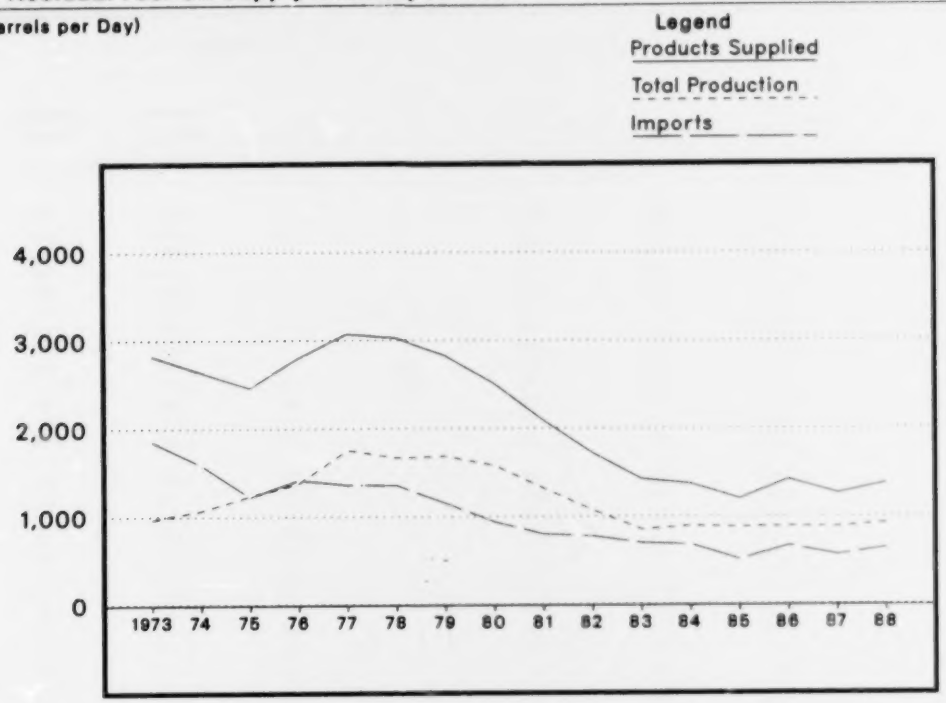


Figure S10. Residual Fuel Oil Ending Stocks

(Million Barrels)

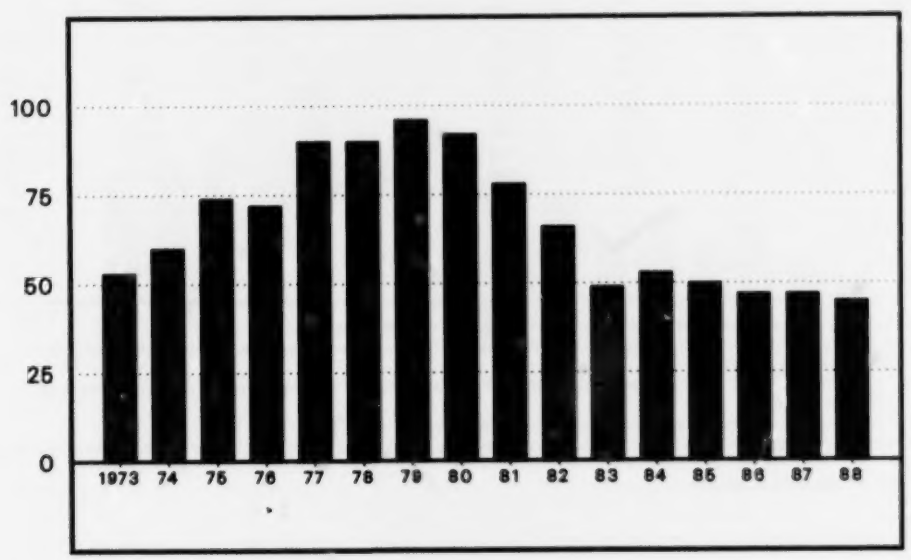


Table S6. Residual Fuel Oil Supply and Disposition

		Supply				Disposition		
		Total Production	Imports	Stock Withdrawal[1]	Crude Used Directly[2]	Exports	Product Supplied[2]	Ending Stocks[3]
		Thousand Barrels per Day						Million Barrels
1973	Average	971	1,853	5	17	23	2,822	[4] 53
1974	Average	1,070	1,587	-17	13	14	2,639	[4] 60
1975	Average	1,235	1,223	[4] 2	15	15	2,402	74
1976	Average	1,377	1,413	5	17	12	2,801	72
1977	Average	1,754	1,359	-48	13	6	3,071	90
1978	Average	1,667	1,355	-1	13	13	3,023	90
1979	Average	1,687	1,151	-15	12	9	2,826	96
1980	Average	1,580	939	10	12	33	2,508	[4] 92
1981	Average[5]	1,321	800	[4] 37	48	118	2,088	[4] 78
1982	Average	1,070	776	32	48	209	1,716	[4] 66
1983	Average	852	699	[4] 55	--	185	1,421	49
1984	Average	891	681	-12	--	190	1,369	53
1985	Average	882	510	7	--	197	1,202	50
1986	January	940	622	56	--	211	1,407	49
	February	856	604	200	--	183	1,478	43
	March	813	626	108	--	113	1,435	40
	April	933	545	127	--	202	1,402	36
	May	913	675	-114	--	129	1,345	39
	June	818	712	-111	--	43	1,377	43
	July	850	673	75	--	90	1,508	40
	August	896	793	-29	--	174	1,485	41
	September	854	841	-89	--	110	1,296	44
	October	827	835	-59	--	144	1,259	46
	November	975	574	-15	--	143	1,391	46
	December	987	913	-37	--	224	1,638	47
	Average	889	669	8	--	147	1,418	--
1987	January	920	701	81	--	198	1,504	45
	February	825	668	243	--	221	1,515	38
	March	863	559	-38	--	150	1,234	39
	April	831	476	114	--	239	1,182	36
	May	813	505	-145	--	144	1,029	40
	June	864	481	-33	--	105	1,207	41
	July	901	721	-108	--	175	1,339	45
	August	882	512	-32	--	185	1,176	46
	September	904	526	42	--	177	1,296	44
	October	887	414	-39	--	194	1,069	46
	November	928	568	-145	--	146	1,205	50
	December	1,001	650	83	--	300	1,434	47
	Average	885	565	(s)	--	186	1,264	--
1988	January	1,002	805	44	--	190	1,661	46
	February	994	901	33	--	229	1,698	45
	March	948	650	43	--	165	1,476	44
	April	960	495	33	--	170	1,318	43
	May	862	432	-94	--	263	938	46
	June	880	336	117	--	249	1,063	42
	July	906	479	37	--	206	1,217	41
	August	866	581	97	--	225	1,320	38
	September	852	698	-220	--	100	1,230	45
	October	852	603	68	--	181	1,343	42
	November	916	785	-51	--	146	1,504	44
	December	1,069	975	-20	--	271	1,754	45
	Average	926	644	8	--	200	1,378	--

[1] A negative number indicates an increase in stocks and a positive number indicates a decrease.
[2] Beginning in January 1983, product supplied for residual fuel oil does not include crude oil used directly. See Explanatory Note 4.
[3] Stocks are totals as of end of period.
[4] In January 1975, 1981, and 1983, numerous respondents were added to surveys affecting stocks reported and stock withdrawal calculations. See Explanatory Note 8.
[5] Beginning in January 1981, survey forms were modified. See Explanatory Note 10.
(s) = Less than 500 barrels per day.
Notes: • Geographic coverage is the 50 States and the District of Columbia. • Totals may not equal sum of components due to independent rounding.
Source: See the last page of this section.

Figure S11. Liquefied Petroleum Gases Supply and Disposition

(Thousand Barrels per Day)

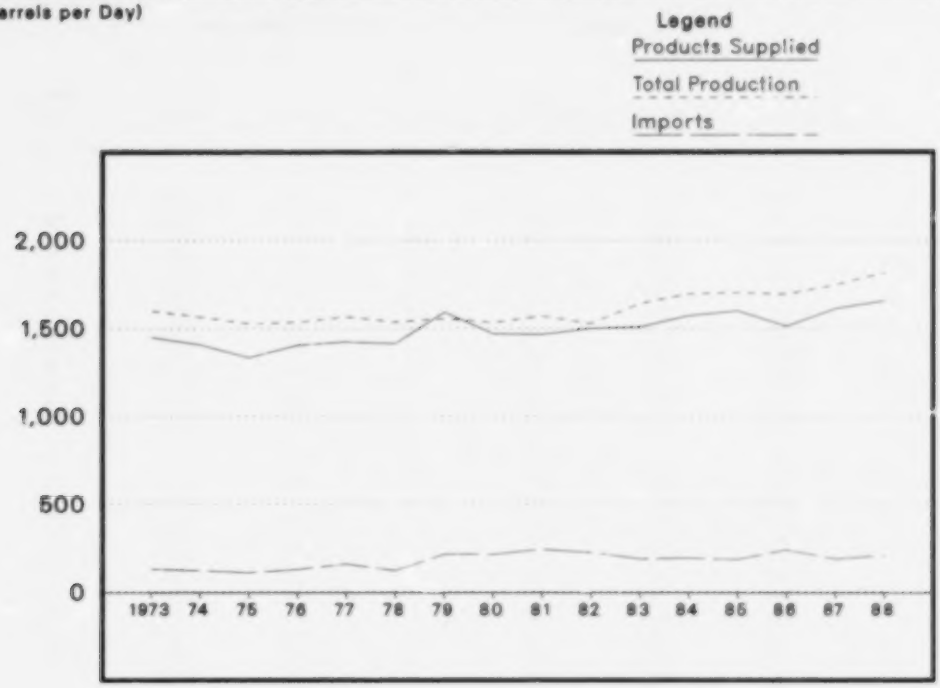


Figure S12. Liquefied Petroleum Gases Ending Stocks

(Million Barrels)

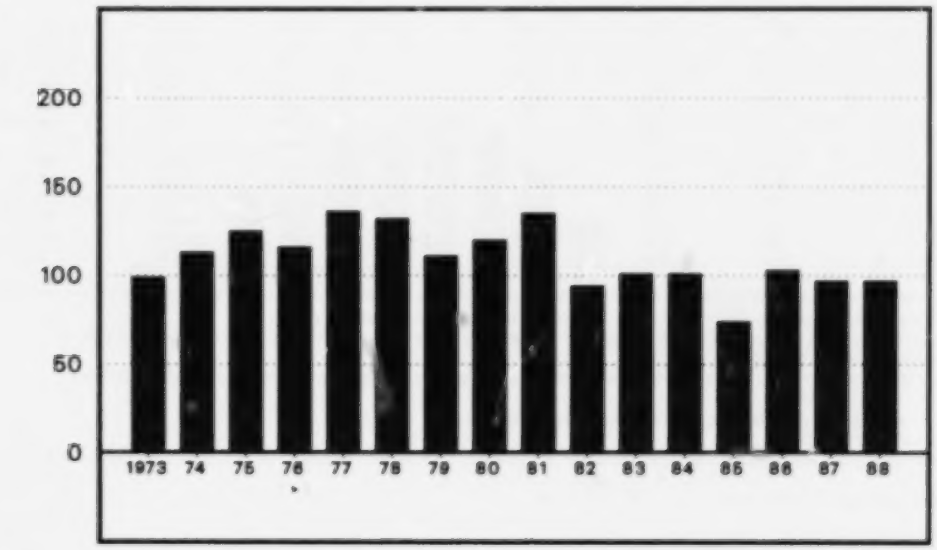


Table S7. Liquefied Petroleum Gases[1] Supply and Disposition

		Supply			Disposition			
		Total Production	Imports	Stock Withdrawal[2]	Refinery Inputs	Exports	Product Supplied	Ending Stocks[3]
		Thousand Barrels per Day						Million Barrels
1973	Average	1,600	132	-35	220	27	1,449	99
1974	Average	1,565	123	-38	220	25	1,406	[4] 113
1975	Average	1,527	112	[4] -35	246	26	1,333	125
1976	Average	1,535	130	24	260	25	1,404	116
1977	Average	1,566	161	-55	233	18	1,422	136
1978	Average	1,537	123	12	239	20	1,413	132
1979	Average	1,556	217	70	236	15	1,592	111
1980	Average	1,535	216	-27	233	21	1,469	[4] 120
1981	Average	1,571	244	[4] -18	289	42	1,466	135
1982	Average	1,528	226	111	300	65	1,499	[4] 94
1983	Average	1,642	190	[4] 4	253	73	1,509	[4] 101
1984	Average	1,697	195	[4] 19	291	48	1,572	101
1985	Average	1,704	187	75	304	62	1,599	74
1986	January	1,850	280	80	364	47	1,800	71
	February	1,815	208	108	325	74	1,733	68
	March	1,693	202	-98	250	47	1,500	71
	April	1,642	134	-200	256	33	1,286	77
	May	1,685	196	-336	267	40	1,238	87
	June	1,649	253	-490	228	25	1,158	102
	July	1,684	303	-450	199	50	1,267	116
	August	1,619	271	-332	243	53	1,262	126
	September	1,631	282	-142	288	27	1,456	131
	October	1,625	234	249	332	26	1,750	123
	November	1,724	310	254	417	53	1,817	115
	December	1,725	227	411	456	33	1,875	103
	Average	1,695	242	-80	302	42	1,512	--
1987	January	1,751	183	500	419	43	1,971	87
	February	1,762	201	205	341	38	1,789	81
	March	1,761	132	-10	282	52	1,550	82
	April	1,775	149	-121	274	36	1,493	85
	May	1,732	142	-283	269	34	1,288	94
	June	1,732	119	-175	255	22	1,400	99
	July	1,764	190	-145	244	30	1,534	104
	August	1,717	198	-259	252	33	1,372	112
	September	1,736	288	-81	266	56	1,622	114
	October	1,736	233	59	294	23	1,711	113
	November	1,763	233	29	356	35	1,735	109
	December	1,753	214	372	395	56	1,887	97
	Average	1,748	190	15	304	38	1,612	--
1988	January	1,734	226	506	383	44	2,099	80
	February	1,770	245	328	366	47	1,929	70
	March	1,819	165	50	292	36	1,707	68
	April	1,806	205	-361	277	43	1,329	79
	May	1,817	165	-343	277	37	1,324	90
	June	1,814	144	-331	256	38	1,333	100
	July	1,842	233	-380	248	35	1,412	112
	August	1,847	241	-287	262	50	1,490	121
	September	1,841	194	-20	274	43	1,698	121
	October	1,872	216	47	318	50	1,761	120
	November	1,835	258	206	445	71	1,782	114
	December	1,811	222	522	461	85	2,010	97
	Average	1,817	209	-1	321	49	1,656	--

[1] Includes ethane, propane, normal butane, and isobutane. Beginning in January 1984, unfractionated stream is reported by individual product.

[2] A negative number indicates an increase in stocks and a positive number indicates a decrease.

[3] Stocks are totals as of end of period.

[4] In January 1975, 1981, 1983, and 1984, a new stock basis was established affecting stocks reported and stock withdrawal calculations. See Explanatory Note 8.

Notes: • Geographic coverage is the 50 States and the District of Columbia. • Totals may not equal sum of components due to independent rounding.

Source: See the last page of this section.

Table S8. Other Petroleum Products[1] Supply and Disposition

		Supply			Disposition			
		Total Production	Imports	Stock Withdrawal[2]	Refinery Inputs	Exports	Products Supplied	Ending Stocks[3]
		Thousand Barrels per Day						Million Barrels
1973	Average	3,693	502	-9	750	166	3,270	[4] 208
1974	Average	3,558	432	-28	665	174	3,123	[4] 218
1975	Average	3,418	277	[4] 4	537	160	3,002	219
1976	Average	3,643	206	-5	524	175	3,145	220
1977	Average	3,912	205	-27	514	165	3,410	230
1978	Average	4,046	166	14	492	167	3,568	225
1979	Average	4,153	195	-37	352	209	3,749	238
1980	Average	3,956	210	-23	311	198	3,634	[4] 247
1981	Average	3,739	226	[4] 46	723	199	3,088	282
1982	Average	3,453	334	80	787	211	2,869	[4] 253
1983	Average	3,460	411	[4] 6	712	242	2,923	[4] 256
1984	Average	3,632	565	[4] 23	791	245	3,183	240
1985	Average	3,721	588	-17	886	240	3,166	246
1986	January	3,902	541	[5] -172	967	311	2,993	[5] 252
	February	3,868	393	-209	747	270	3,035	[5] 258
	March	3,754	454	[5] 21	854	208	3,167	257
	April	3,788	638	-100	760	369	3,196	260
	May	4,055	659	-114	810	298	3,492	[5] 264
	June	4,209	687	[5] -70	853	263	3,710	266
	July	4,145	589	[5] 119	1,064	357	3,432	262
	August	4,223	572	335	1,061	301	3,768	[5] 252
	September	4,225	571	[5] 35	846	278	3,708	[5] 251
	October	3,969	575	[5] -112	666	375	3,391	254
	November	3,904	559	[5] 36	940	342	3,217	253
	December	3,920	490	[5] 90	1,069	325	3,105	250
	Average	3,997	561	-10	888	308	3,353	--
1987	January	3,852	469	-121	659	219	3,323	254
	February	3,796	687	-389	352	320	3,422	265
	March	3,766	663	-128	757	281	3,262	269
	April	3,933	589	107	872	254	3,502	266
	May	4,049	529	178	913	320	3,523	260
	June	4,203	712	158	896	320	3,857	255
	July	4,363	550	91	835	256	3,913	253
	August	4,340	616	-148	693	238	3,876	257
	September	4,350	611	-24	903	353	3,681	258
	October	4,223	686	14	971	272	3,680	258
	November	4,010	583	-20	975	305	3,294	258
	December	4,050	633	261	1,091	330	3,523	250
	Average	4,080	610	1	829	289	3,572	--
1988	January	3,942	706	-136	812	354	3,347	254
	February	3,905	680	-31	753	318	3,484	255
	March	4,147	666	-282	687	328	3,515	264
	April	4,010	794	-87	851	288	3,577	266
	May	4,071	843	-335	501	274	3,803	277
	June	4,265	787	43	777	379	3,939	276
	July	4,315	781	-21	831	329	3,915	276
	August	4,413	701	199	796	302	4,215	270
	September	4,245	651	159	850	323	3,882	265
	October	4,163	771	40	762	268	3,944	264
	November	4,068	823	-43	818	303	3,728	265
	December	4,155	813	429	1,153	392	3,653	252
	Average	4,143	735	-6	799	321	3,751	--

[1] Includes pentanes plus, other hydrocarbons and alcohol, unfinished oils, gasoline blending components and all finished petroleum products except finished motor gasoline, distillate fuel oil, residual fuel oil, and liquefied petroleum gases.

[2] A negative number indicates an increase in stocks and a positive number indicates a decrease.

[3] Stocks are totals as of end of period.

[4] In January 1975, 1981, 1983, and 1984, a new stock basis was established affecting stocks reported and stock withdrawal calculations. See Explanatory Note 8.

[5] Ending stocks and stock withdrawal for 1986 are slightly different from those published in the 1986 *Petroleum Supply Annual* (PSA)--Volume 1. *PSA* statistics inadvertently omitted stocks of other hydrocarbons and alcohol.

Notes: • Geographic coverage is the 50 States and the District of Columbia. • Totals may not equal sum of components due to independent rounding.

Source: See the last page of this section.

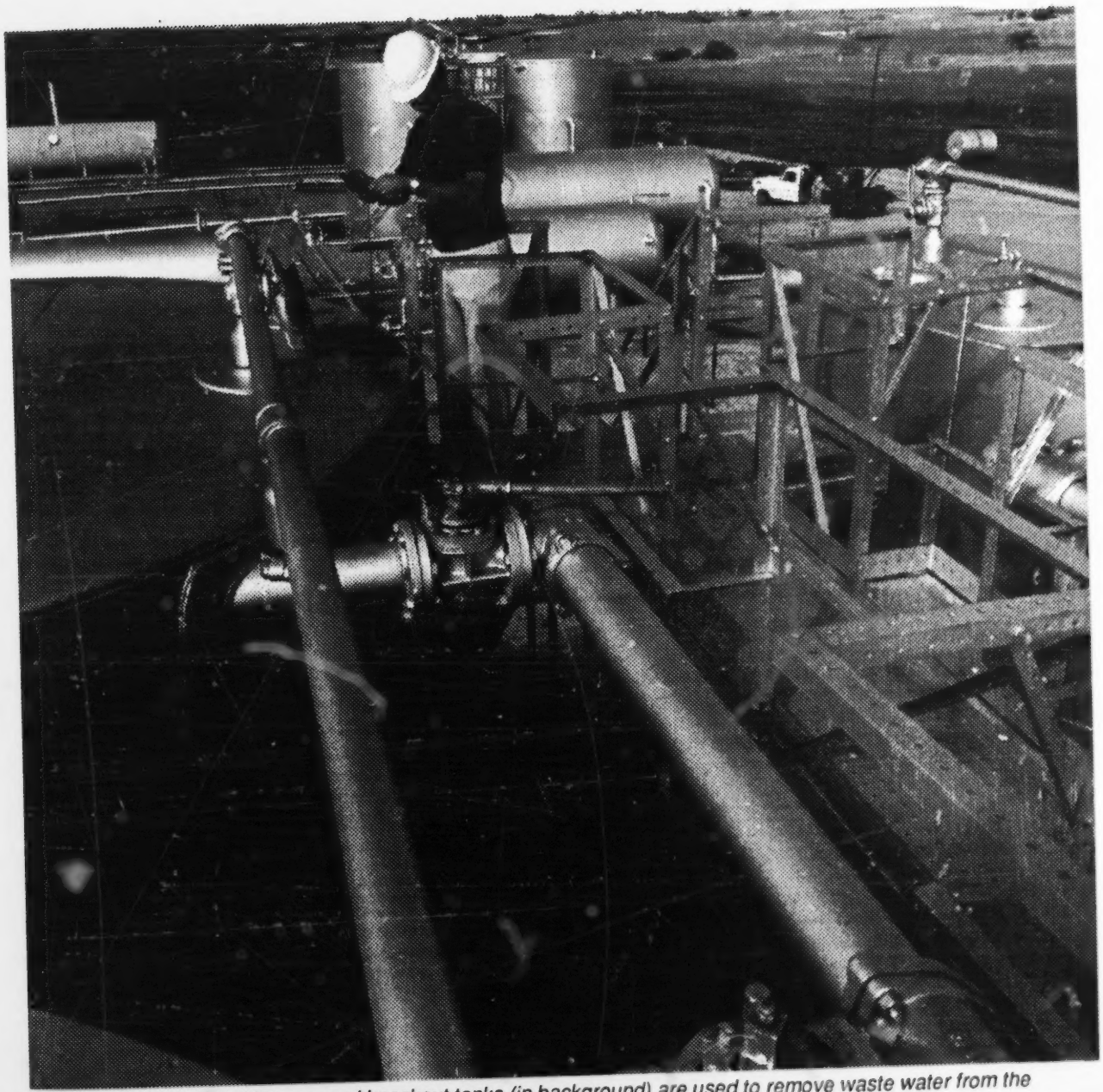
Sources of Summary Statistics

1. 1973 through 1976: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, *Petroleum Statement, Annual* and *PAD Districts Supply/Demand, Annual*.

2. 1977 through 1980: U.S. Department of Energy, Energy Information Administration (EIA), *Energy Data Reports, Petroleum Statement, Annual* and *PAD Districts Supply/Demand, Annual*, and unleaded gasoline data from *Monthly Petroleum Statistics Report*.

3. 1981 through 1988: EIA, *Petroleum Supply Annual*.

Detailed Statistics



At some locations, oil skimmers and knockout tanks (in background) are used to remove waste water from the crude oil. The crude oil is then put into storage tanks and gauged.

Changes in Natural Gas Liquids and Crude Oil Statistics

Beginning in 1988, adjustments are being made to refinery inputs and product supplied of natural gas liquids (NGLs) and refinery inputs of crude oil to account for refiner misreporting. Substantial volumes of NGLs are produced at natural gas processing plants in Alaska and injected into the crude oil moving in the Trans Alaska Pipeline System (TAPS). Refiners receiving any crude oil commingled with NGLs are instructed to report the NGL portion of that stream separately from the crude oil portion. This has not been done for Alaskan crude oil because refiners are unable to identify these volumes for accounting purposes. As a result, the NGL production in Alaska has been credited directly toward product supplied and also toward product supplied from refinery production when the refiner processes the crude oil-NGL mixture. In addition, the reporting of the commingled stream as crude oil by the refiner has overstated crude oil inputs and resulted in an increase in unaccounted for crude oil equal to the volume of NGL in the crude oil.

To offset this reporting error, an adjustment is being made to refinery input in all PAD Districts receiving Alaskan crude oil. The adjustment reduces the crude oil inputs and increases the NGL inputs by an equal amount. Each PAD District adjustment is a portion of the known Alaskan NGL production that is proportional to the PAD District's share of Alaskan crude oil received at all refineries in the United States. The greatest impact occurs in PAD District V for butane and pentanes plus.

The reporting problem began in 1987 and has grown as injections of NGLs into the TAPS have increased. Revisions for 1987 data are not planned.

Table 1. U.S. Petroleum Balance, 1988

	Thousand Barrels	Thousand Barrels per Day
Crude Oil (Including Lease Condensate)		
Field Production		
(1) Alaska	738,143	2,017
(2) Lower 48 States	2,240,980	6,123
(3) Total U.S.	2,979,123	8,140
Net Imports		
(4) Imports (Gross Excluding SPR)	1,850,247	5,055
(5) SPR Imports	18,758	51
(6) Exports	56,713	155
(7) Imports (Net Including SPR)	1,812,292	4,952
Other Sources		
(8) SPR Withdrawal (+) or Addition (-)	-18,867	-52
(9) Other Stock Withdrawal (+) or Addition (-)	18,636	51
(10) Product Supplied and Losses	-14,748	-40
(11) Unaccounted for [1]	71,739	196
(12) Total Other Sources	56,760	155
(13) Crude Input to Refineries	4,848,175	13,246
(13) = (3) + (7) + (12)		
Natural Gas Plant Liquids (NGPL)		
(14) Field Production	594,692	1,625
(15) Net Imports [2]	3,394	9
(16) Stock Withdrawal (+) or Addition (-) [2]	376	1
(17) Total NGPL Supply	598,462	1,635
Other Liquids		
Unfinished Oils and Gasoline Blending Components, Total		
(18) Stock Withdrawal (+) or Addition (-)	-7,867	-21
(19) Imports	152,569	417
(20) Other Hydrocarbons and Alcohol New Supply (Field Production)	19,536	53
(21) Refinery Processing Gain [1]	239,760	655
(22) Crude Oil Product Supplied	14,697	40
(23) Total Other Liquids	418,695	1,144
(23) = (18) through (22)		
(24) Total Production of Products [3]	5,865,332	16,025
(24) = (13) + (17) + (23)		
Net Imports of Refined Products [3]		
(25) Imports (Gross)	683,388	1,867
(26) Exports	240,969	658
(27) Imports (Net)	442,419	1,209
(28) Total New Supply of Products	6,307,751	17,234
(28) = (24) + (27)		
(29) Refined Products Stock Withdrawal (+) or Addition (-) [3]	17,941	49
(30) Total Petroleum Products Supplied for Domestic Use	6,325,692	17,283
(30) = (28) + (29)		
(31) Finished Motor Gasoline	2,685,145	7,336
(32) Distillate Fuel Oil	1,142,510	3,122
(33) Residual Fuel Oil	504,275	1,378
(34) Liquefied Petroleum Gases	606,069	1,656
(35) Other [4]	1,372,996	3,751
(36) Crude Oil	14,697	40
(37) Total Product Supplied	6,325,692	17,283
(37) = (31) through (36)		
Ending Stocks, All Oils		
(38) Crude Oil and Lease Condensate (Excluding SPR)	330,359	--
(39) Strategic Petroleum Reserve (SPR)	559,515	--
(40) Unfinished Oils	99,858	--
(41) Gasoline Blending Components [5]	39,249	--
(42) Pentanes Plus	6,649	--
(43) Finished Refined Products [3]	561,602	--
(44) Total Stocks	1,597,232	--

1 A balancing item.
2 Includes products in the pentanes plus category only.
3 For products included see Explanatory Note 7.7.
4 Includes pentanes plus, other liquids, and all finished petroleum products except finished motor gasoline, distillate fuel oil, residual fuel oil and liquefied petroleum gases.
5 Includes other hydrocarbons and alcohol.
Note: Totals may not equal sum of components due to independent rounding.
Sources and estimation procedures: See Explanatory Notes 1, 2 and 7.7.

Table 2. Supply and Disposition of Crude Oil and Petroleum Products, 1988
(Thousand Barrels)

Commodity	Supply					Disposition				Ending Stocks
	Field Production	Refinery Production	Imports	Stock Withdrawal (+) or Addition (-)	Unaccounted For Crude Oil[1]	Crude Losses	Refinery Inputs	Exports	Products Supplied	
Crude Oil (including lease condensate)	**2,979,123**	**0**	**1,869,005**	**-231**	**71,739**	**51**	**4,848,175**	**56,713**	**14,697**	**889,874**
Natural Gas Liquids and LRGs	**593,283**	**182,611**	**80,816**	**131**	**0**	**0**	**186,902**	**18,631**	**651,308**	**103,988**
Pentanes Plus	110,707	0	4,178	376	0	0	69,238	784	45,239	6,649
Liquefied Petroleum Gases	482,576	182,611	76,638	-245	0	0	117,664	17,847	606,069	97,339
Ethane	183,355	3,808	1,240	4,389	0	0	821	1,581	190,390	17,872
Propane	185,374	130,655	38,764	-2,635	0	0	3,105	11,307	337,747	50,427
Normal Butane	61,300	43,353	23,759	-4,467	0	0	60,158	4,176	59,612	21,009
Isobutane	52,547	4,795	12,874	2,468	0	0	53,580	784	18,320	8,031
Other Liquids	**19,536**	**0**	**152,569**	**-7,867**	**0**	**0**	**223,309**	**0**	**-59,071**	**139,107**
Other Hydrocarbons and Alcohol	19,536	0	0	-21	0	0	19,515	0	0	448
Unfinished Oils	0	0	131,599	-6,673	0	0	172,567	0	-47,641	99,858
Motor Gasoline Blending Components	0	0	20,970	-1,179	0	0	31,009	0	-11,218	38,551
Aviation Gasoline Blending Components	0	0	0	6	0	0	218	0	-212	250
Finished Petroleum Products	**1,409**	**5,315,535**	**606,750**	**18,186**	**0**	**0**	**0**	**223,122**	**5,718,758**	**464,263**
Finished Motor Gasoline	117	2,545,768	148,372	-1,041	0	0	0	8,071	2,685,145	189,852
Finished Leaded Motor Gasoline	105	476,570	3,566	12,958	0	0	0	2,394	490,805	40,159
Finished Unleaded Motor Gasoline	12	2,069,198	144,806	-13,999	0	0	0	5,677	2,194,340	149,693
Finished Aviation Gasoline	0	9,297	195	213	0	0	0	0	9,705	2,118
Naphtha-Type Jet Fuel	0	75,393	1,051	1,905	0	0	0	494	77,855	6,051
Kerosene-Type Jet Fuel	0	425,930	31,878	4,250	0	0	0	9,703	452,355	37,723
Kerosene	0	28,770	5,701	1,163	0	0	0	435	35,199	7,284
Distillate Fuel Oil	502	1,045,786	110,354	10,968	0	0	0	25,100	1,142,510	123,517
Residual Fuel Oil	0	338,734	235,860	2,789	0	0	0	73,108	504,275	44,621
Naphtha < 400 Deg. for Petro. Feed. Use	0	40,225	29,541	376	0	0	0	2,386	67,756	1,961
Other Oils > 400 Deg. for Petro. Feed. Use	0	82,266	24,000	-142	0	0	0	6,018	100,106	1,743
Special Naphthas	0	21,773	2,403	167	0	0	0	2,611	21,732	3,487
Lubricants	0	62,291	3,937	-45	0	0	0	9,582	56,601	13,316
Waxes	0	6,166	631	-41	0	0	0	625	6,131	824
Petroleum Coke	0	199,056	607	-1,040	0	0	0	84,556	114,067	7,790
Asphalt and Road Oil	0	162,066	11,523	-2,018	0	0	0	335	171,236	20,817
Still Gas	0	245,351	0	0	0	0	0	0	245,351	0
Miscellaneous Products	790	26,663	697	682	0	0	0	98	28,734	3,159
Total	**3,593,351**	**5,498,146**	**2,709,140**	**10,219**	**71,739**	**51**	**5,258,386**	**298,466**	**6,325,692**	**1,597,232**

[1] Unaccounted for crude oil is a balancing item.
(s) = Less than 500 barrels.
Note: Total may not equal sum of components due to independent rounding.
Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 3. Daily Average Supply and Disposition of Crude Oil and Petroleum Products, 1988
(Thousand Barrels per Day)

Commodity	Supply					Disposition			
	Field Production	Refinery Production	Imports	Stock Withdrawal (+) or Addition (-)	Unaccounted For Crude Oil[1]	Crude Losses	Refinery Inputs	Exports	Products Supplied
Crude Oil (including lease condensate)	**8,140**	**0**	**5,107**	**-1**	**196**	**(s)**	**13,246**	**155**	**40**
Natural Gas Liquids and LRGs	**1,621**	**499**	**221**	**(s)**	**0**	**0**	**511**	**51**	**1,780**
Pentanes Plus	302	0	11	1	0	0	189	2	124
Liquefied Petroleum Gases	1,319	499	209	-1	0	0	321	49	1,656
Ethane	501	10	3	2	0	0	2	4	520
Propane	506	357	106	-7	0	0	8	31	923
Normal Butane	167	118	65	-12	0	0	164	11	163
Isobutane	144	13	35	7	0	0	146	2	50
Other Liquids	**53**	**0**	**417**	**-21**	**0**	**0**	**610**	**0**	**-161**
Other Hydrocarbons and Alcohol	53	0	0	(s)	0	0	53	0	0
Unfinished Oils	0	0	360	18	0	0	471	0	-130
Motor Gasoline Blending Components	0	0	57	-3	0	0	85	0	-31
Aviation Gasoline Blending Components	0	0	0	(s)	0	0	1	0	-1
Finished Petroleum Products	**4**	**14,523**	**1,658**	**50**	**0**	**0**	**0**	**610**	**15,625**
Finished Motor Gasoline	(s)	6,956	405	-3	0	0	0	22	7,336
Finished Leaded Motor Gasoline	(s)	1,302	10	35	0	0	0	7	1,341
Finished Unleaded Motor Gasoline	(s)	5,654	396	-38	0	0	0	16	5,995
Finished Aviation Gasoline	0	25	1	1	0	0	0	0	27
Naphtha-Type Jet Fuel	0	206	3	5	0	0	0	1	213
Kerosene-Type Jet Fuel	0	1,164	87	12	0	0	0	27	1,236
Kerosene	0	79	16	3	0	0	0	1	96
Distillate Fuel Oil	1	2,857	302	30	0	0	0	69	3,122
Residual Fuel Oil	0	926	644	8	0	0	0	200	1,378
Naphtha < 400 Deg. for Petro. Feed. Use	0	110	81	1	0	0	0	7	185
Other Oils > 400 Deg. for Petro. Feed. Use	0	225	66	(s)	0	0	0	16	274
Special Naphthas	0	59	7	(s)	0	0	0	7	59
Lubricants	0	170	11	(s)	0	0	0	26	155
Waxes	0	17	2	(s)	0	0	0	2	17
Petroleum Coke	0	544	2	-3	0	0	0	231	312
Asphalt and Road Oil	0	443	31	-6	0	0	0	1	468
Still Gas	0	670	0	0	0	0	0	0	670
Miscellaneous Products	2	73	2	2	0	0	0	(s)	79
Total	**9,818**	**15,022**	**7,402**	**28**	**196**	**(s)**	**14,367**	**815**	**17,283**

1 Unaccounted for crude oil is a balancing item.
(s) = Less than 500 barrels per day.
Note: Total may not equal sum of components due to independent rounding.
Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 4. PAD District I--Supply and Disposition of Crude Oil and Petroleum Products, 1988
(Thousand Barrels)

Commodity	Supply						Disposition				Ending Stocks
	Field Production	Refinery Production	Imports by PADD of Entry	Stock Withdrawal (+) or Addition (-)	Unaccounted For Crude Oil[1]	Net Receipts	Crude Losses	Refinery Inputs	Exports	Products Supplied	
Crude Oil (including lease condensate)	**13,788**	**0**	**430,035**	**-24**	**9,232**	**22,006**	**7**	**475,030**	**(s)**	**0**	**15,559**
Natural Gas Liquids and LRGs	**9,971**	**20,181**	**16,693**	**838**	**0**	**34,261**	**0**	**2,321**	**850**	**78,772**	**4,832**
Liquefied Petroleum Gases	8,587	20,181	13,593	834	0	34,261	0	1,835	850	74,770	4,783
Pentanes Plus	1,384	0	3,100	4	0	0	0	486	0	4,002	49
Other Liquids	**392**	**0**	**62,918**	**-42**	**0**	**3,668**	**0**	**80,467**	**0**	**-13,531**	**17,290**
Other Hydrocarbons and Alcohol	392	0	0	20	0	0	0	412	0	0	0
Unfinished Oils	0	0	44,995	-647	0	2,118	0	63,914	0	-17,448	12,370
Motor Gasoline Blending Components	0	0	17,923	585	0	1,550	0	16,141	0	3,917	4,920
Aviation Gasoline Blending Components	0	0	0	0	0	0	0	0	0	0	0
Finished Petroleum Products	**0**	**563,223**	**491,390**	**9,769**	**0**	**871,180**	**0**	**0**	**7,369**	**1,928,194**	**150,138**
Finished Motor Gasoline	0	258,537	132,498	-73	0	494,909	0	0	240	885,631	57,542
Finished Leaded Motor Gasoline	0	25,450	3,189	4,830	0	66,865	0	0	56	100,278	7,952
Finished Unleaded Motor Gasoline	0	233,087	129,309	-4,903	0	428,044	0	0	185	785,352	49,590
Finished Aviation Gasoline	0	108	0	118	0	1,853	0	0	0	2,079	378
Naphtha-Type Jet Fuel	0	8,825	0	582	0	5,715	0	0	9	15,113	979
Kerosene-Type Jet Fuel	0	25,155	20,770	857	0	123,149	0	0	274	169,658	9,434
Kerosene	0	2,629	3,379	164	0	6,312	0	0	92	12,392	3,173
Distillate Fuel Oil	0	121,951	104,576	4,531	0	211,443	0	0	349	442,152	49,223
Residual Fuel Oil	0	52,588	212,374	4,316	0	7,159	0	0	167	276,270	18,803
Petrochemical Feedstocks[2]	0	3,239	2,781	-12	0	-69	0	0	704	5,235	376
Special Naphthas	0	1,604	456	134	0	3,214	0	0	577	4,833	1,152
Lubricants	0	6,662	3,358	55	0	11,674	0	0	2,769	20,980	2,909
Waxes	0	1,022	340	-15	0	59	0	0	76	1,330	79
Petroleum Coke	0	15,677	41	-336	0	0	0	0	2,013	13,366	856
Asphalt and Road Oil	0	34,731	10,239	-581	0	5,100	0	0	9	49,480	4,520
Still Gas	0	23,466	0	0	0	0	0	0	0	23,466	0
Miscellaneous Products	0	5,027	576	29	0	662	0	0	88	6,206	714
Total	**24,151**	**583,404**	**1,001,036**	**10,541**	**9,232**	**931,115**	**7**	**557,818**	**8,219**	**1,993,435**	**167,819**

1 Unaccounted for crude oil is a balancing item.
2 Includes naphtha less than 400 degrees F endpoint and other oils equal to or greater than 400 degrees F endpoint.
(s) = Less than 500 barrels.
Note: Total may not equal sum of components due to independent roundin
Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 5. PAD District II--Supply and Disposition of Crude Oil and Petroleum Products, 1988

(Thousand Barrels)

Commodity	Supply						Disposition				Ending Stocks
	Field Production	Refinery Production	Imports by PADD of Entry	Stock Withdrawal (+) or Addition (-)	Unaccounted For Crude Oil[1]	Net Receipts	Crude Losses	Refinery Inputs	Exports	Products Supplied	
Crude Oil (including lease condensate)	**301,993**	**0**	**192,515**	**1,467**	**3,160**	**571,980**	**0**	**1,067,389**	**3,727**	**0**	**71,576**
Natural Gas Liquids and LRGs	**111,296**	**31,951**	**33,051**	**547**	**0**	**14,302**	**0**	**48,076**	**6,445**	**136,626**	**31,985**
Liquefied Petroleum Gases	94,034	31,951	32,640	131	0	7,880	0	33,699	5,661	127,276	29,610
Pentanes Plus	17,262	0	411	416	0	6,422	0	14,377	784	9,350	2,375
Other Liquids	**3,421**	**0**	**41**	**-764**	**0**	**-67**	**0**	**22,886**	**0**	**-20,255**	**22,673**
Other Hydrocarbons and Alcohol	3,421	0	0	93	0	0	0	3,514	0	0	93
Unfinished Oils	0	0	0	-1,274	0	850	0	6,298	0	-6,722	15,154
Motor Gasoline Blending Components	0	0	41	414	0	-917	0	12,872	0	-13,334	7,273
Aviation Gasoline Blending Components	0	0	0	3	0	0	0	202	0	-199	153
Finished Petroleum Products	**50**	**1,156,369**	**12,629**	**5,708**	**0**	**273,189**	**0**	**0**	**5,494**	**1,442,451**	**111,034**
Finished Motor Gasoline	0	626,339	1,491	953	0	175,138	0	0	668	803,253	52,544
Finished Leaded Motor Gasoline	0	112,155	30	4,623	0	35,736	0	0	36	152,506	13,212
Finished Unleaded Motor Gasoline	0	514,184	1,461	-3,670	0	139,402	0	0	632	650,745	39,332
Finished Aviation Gasoline	0	1,219	0	218	0	1,187	0	0	0	2,624	477
Naphtha-Type Jet Fuel	0	7,806	1,018	442	0	-290	0	0	(s)	8,976	885
Kerosene-Type Jet Fuel	0	62,282	4,494	1,293	0	30,402	0	0	7	98,464	7,569
Kerosene	0	6,254	0	775	0	-1,461	0	0	245	5,323	1,932
Distillate Fuel Oil	0	245,696	2,090	3,337	0	64,540	0	0	452	315,211	31,305
Residual Fuel Oil	0	26,203	1,873	-504	0	-2,810	0	0	0	24,762	3,542
Petrochemical Feedstocks[2]	0	14,398	174	143	0	787	0	0	672	14,830	273
Special Naphthas	0	3,767	677	-8	0	1,594	0	0	178	5,952	653
Lubricants	0	9,582	175	-83	0	2,950	0	0	514	12,110	2,208
Waxes	0	604	172	-16	0	10	0	0	140	630	115
Petroleum Coke	0	42,423	0	-611	0	0	0	0	2,375	39,437	1,486
Asphalt and Road Oil	0	54,166	403	-314	0	1,278	0	0	241	55,292	7,619
Still Gas	0	51,104	0	0	0	0	0	0	0	51,104	0
Miscellaneous Products	50	4,526	62	83	0	-136	0	0	1	4,584	426
Total	**416,761**	**1,188,320**	**238,236**	**6,958**	**3,160**	**859,404**	**0**	**1,138,351**	**15,666**	**1,558,822**	**237,268**

1 Unaccounted for crude oil is a balancing item.

2 Includes naphtha less than 400 degrees F endpoint and other oils equal to or greater than 400 degrees F endpoint.

(s) = Less than 500 barrels.

Note: Total may not equal sum of components due to independent rounding.

Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 6. PAD District III–Supply and Disposition of Crude Oil and Petroleum Products, 1988
(Thousand Barrels)

Commodity	Supply						Disposition				Ending Stocks
	Field Production	Refinery Production	Imports by PADD of Entry	Stock Withdrawal (+) or Addition (-)	Unaccounted For Crude Oil[1]	Net Receipts	Crude Losses	Refinery Inputs	Exports	Products Supplied	
Crude Oil (including lease condensate)	**1,333,149**	**0**	**1,149,357**	**-13,193**	**29,083**	**-299,580**	**31**	**2,198,787**	**0**	**0**	**711,411**
Natural Gas Liquids and LRGs	**393,702**	**104,059**	**22,410**	**-732**	**0**	**-25,555**	**0**	**104,282**	**8,140**	**381,461**	**63,258**
Liquefied Petroleum Gases	327,524	104,059	22,088	-664	0	-21,394	0	61,572	8,140	361,900	59,206
Pentanes Plus	66,178	0	322	-68	0	-4,161	0	42,710	0	19,561	4,052
Other Liquids	**10,889**	**0**	**86,418**	**-5,215**	**0**	**-4,575**	**0**	**110,285**	**0**	**-22,768**	**63,010**
Other Hydrocarbons and Alcohol	10,889	0	0	-106	0	0	0	10,783	0	0	299
Unfinished Oils	0	0	83,732	-4,939	0	-3,818	0	98,941	0	-23,966	47,549
Motor Gasoline Blending Components	0	0	2,686	-154	0	-757	0	576	0	1,199	15,077
Aviation Gasoline Blending Components	0	0	0	-16	0	0	0	-15	0	-1	85
Finished Petroleum Products	**1,323**	**2,418,297**	**68,378**	**6,313**	**0**	**-1,177,747**	**0**	**0**	**102,889**	**1,213,676**	**129,202**
Finished Motor Gasoline	117	1,144,791	3,218	984	0	-688,215	0	0	5,310	455,585	49,982
Finished Leaded Motor Gasoline	105	199,741	39	3,172	0	-106,357	0	0	2,102	94,598	9,604
Finished Unleaded Motor Gasoline	12	945,050	3,179	-2,188	0	-581,858	0	0	3,207	360,988	40,378
Finished Aviation Gasoline	0	5,597	39	-40	0	-3,300	0	0	0	2,296	696
Naphtha-Type Jet Fuel	0	34,730	0	900	0	-8,002	0	0	248	27,380	1,933
Kerosene-Type Jet Fuel	0	211,172	1,718	1,575	0	-161,873	0	0	5,925	46,667	13,144
Kerosene	0	17,960	2,150	125	0	-4,851	0	0	44	15,340	1,027
Distillate Fuel Oil	502	477,043	913	3,349	0	-279,986	0	0	12,201	189,620	28,168
Residual Fuel Oil	0	117,837	8,554	114	0	-4,349	0	0	20,758	101,398	12,438
Petrochemical Feedstocks[2]	0	99,153	49,620	102	0	-718	0	0	4,728	143,429	2,733
Special Naphthas	0	15,205	1,112	26	0	-4,808	0	0	1,155	10,380	1,509
Lubricants	0	37,018	220	-249	0	-14,703	0	0	4,291	17,995	6,759
Waxes	0	3,316	18	-28	0	-69	0	0	311	2,926	457
Petroleum Coke	0	88,092	345	-248	0	0	0	0	47,899	40,290	3,665
Asphalt and Road Oil	0	40,055	412	-357	0	-6,378	0	0	17	33,715	4,152
Still Gas	0	111,953	0	0	0	0	0	0	0	111,953	0
Miscellaneous Products	704	14,375	59	60	0	-495	0	0	3	14,700	1,639
Total	**1,739,065**	**2,522,356**	**1,326,563**	**-12,827**	**29,083**	**-1,507,457**	**31**	**2,413,354**	**111,029**	**1,572,369**	**966,881**

1 Unaccounted for crude oil is a balancing item.
2 Includes naphtha less than 400 degrees F endpoint and other oils equal to or greater than 400 degrees F endpoint.
(s) = Less than 500 barrels.
Note: Total may not equal sum of components due to independent rounding.
Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 7. PAD District IV--Supply and Disposition of Crude Oil and Petroleum Products, 1988
(Thousand Barrels)

Commodity	Supply						Disposition				Ending Stocks
	Field Production	Refinery Production	Imports by PADD of Entry	Stock Withdrawal (+) or Addition (-)	Unaccounted For Crude Oil[1]	Net Receipts	Crude Losses	Refinery Inputs	Exports	Products Supplied	
Crude Oil (including lease condensate)	**202,692**	**0**	**23,456**	**739**	**23,099**	**-84,691**	**0**	**165,297**	**0**	**0**	**11,791**
Natural Gas Liquids and LRGs	**45,816**	**3,367**	**4,840**	**-30**	**0**	**-23,008**	**0**	**7,186**	**433**	**23,366**	**1,118**
Liquefied Petroleum Gases	36,593	3,367	4,495	-41	0	-20,747	0	5,962	433	17,272	976
Pentanes Plus	9,223	0	345	11	0	-2,261	0	1,224	0	6,094	143
Other Liquids	**247**	**0**	**0**	**-127**	**0**	**0**	**0**	**-903**	**0**	**1,023**	**4,187**
Other Hydrocarbons and Alcohol	247	0	0	-26	0	0	0	221	0	0	40
Unfinished Oils	0	0	0	516	0	0	0	-1,686	0	2,202	1,806
Motor Gasoline Blending Components	0	0	0	-617	0	0	0	562	0	-1,179	2,341
Aviation Gasoline Blending Components	0	0	0	0	0	0	0	0	0	0	0
Finished Petroleum Products	**36**	**172,197**	**1,965**	**-907**	**0**	**-5,320**	**0**	**0**	**70**	**167,901**	**12,563**
Finished Motor Gasoline	0	87,379	573	-140	0	-5,061	0	0	1	82,750	5,195
Finished Leaded Motor Gasoline	0	31,558	30	89	0	-4,330	0	0	1	27,346	2,105
Finished Unleaded Motor Gasoline	0	55,821	543	-229	0	-731	0	0	(s)	55,404	3,090
Finished Aviation Gasoline	0	277	0	7	0	191	0	0	0	475	47
Naphtha-Type Jet Fuel	0	4,969	0	11	0	-1,701	0	0	2	3,277	419
Kerosene-Type Jet Fuel	0	9,122	0	187	0	5,586	0	0	(s)	14,895	649
Kerosene	0	64	0	50	0	0	0	0	1	113	42
Distillate Fuel Oil	0	43,449	1,352	267	0	-4,335	0	0	1	40,732	2,831
Residual Fuel Oil	0	4,011	7	-276	0	0	0	0	0	3,742	663
Petrochemical Feedstocks[2]	0	118	0	23	0	0	0	0	11	130	10
Special Naphthas	0	-16	1	0	0	0	0	0	2	-17	7
Lubricants	0	262	0	41	0	0	0	0	42	281	69
Waxes	0	422	11	9	0	0	0	0	(s)	442	78
Petroleum Coke	0	3,930	0	16	0	0	0	0	3	3,943	15
Asphalt and Road Oil	0	10,285	21	-1,064	0	0	0	0	8	9,234	2,479
Still Gas	0	7,192	0	0	0	0	0	0	0	7,192	0
Miscellaneous Products	36	713	0	-38	0	0	0	0	0	711	59
Total	**248,793**	**175,564**	**30,261**	**-325**	**23,099**	**-113,019**	**0**	**171,580**	**503**	**192,290**	**29,659**

1 Unaccounted for crude oil is a balancing item.
2 Includes naphtha less than 400 degrees F endpoint and other oils equal to or greater than 400 degrees F endpoint.
(s) = Less than 500 barrels.
Note: Total may not equal sum of components due to independent rounding.
Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 8. PAD District V--Supply and Disposition of Crude Oil and Petroleum Products, 1988
(Thousand Barrels)

Commodity	Supply						Disposition				Ending Stocks
	Field Production	Refinery Production	Imports by PADD of Entry	Stock Withdrawal (+) or Addition (-)	Unaccounted For Crude Oil[1]	Net Receipts	Crude Losses	Refinery Inputs	Exports	Products Supplied	
Crude Oil (including lease condensate)	**1,127,501**	**0**	**73,642**	**10,780**	**7,161**	**-209,715**	**13**	**941,672**	**52,986**	**14,697**	**79,537**
Natural Gas Liquids and LRGs	**32,498**	**23,053**	**3,823**	**-492**	**0**	**0**	**0**	**25,037**	**2,762**	**31,082**	**2,795**
Liquefied Petroleum Gases	15,838	23,053	3,823	-505	0	0	0	14,596	2,762	24,850	2,765
Pentanes Plus	16,660	0	0	13	0	0	0	10,441	0	6,232	30
Other Liquids	**4,587**	**0**	**3,192**	**-1,719**	**0**	**974**	**0**	**10,574**	**0**	**-3,540**	**31,947**
Other Hydrocarbons and Alcohol	4,587	0	0	-2	0	0	0	4,585	0	0	16
Unfinished Oils	0	0	2,872	-329	0	850	0	5,100	0	-1,707	22,979
Motor Gasoline Blending Components	0	0	320	-1,407	0	124	0	858	0	-1,821	8,940
Aviation Gasoline Blending Components	0	0	0	19	0	0	0	31	0	-12	12
Finished Petroleum Products	**0**	**1,005,449**	**32,387**	**-2,697**	**0**	**38,698**	**0**	**0**	**107,301**	**966,536**	**61,326**
Finished Motor Gasoline	0	428,722	10,592	-2,765	0	23,229	0	0	1,852	457,926	24,589
Finished Leaded Motor Gasoline	0	107,666	278	244	0	8,086	0	0	199	116,075	7,286
Finished Unleaded Motor Gasoline	0	321,056	10,314	-3,009	0	15,143	0	0	1,653	341,851	17,303
Finished Aviation Gasoline	0	2,096	156	-90	0	69	0	0	0	2,231	520
Naphtha-Type Jet Fuel	0	19,063	33	-30	0	4,278	0	0	235	23,109	1,835
Kerosene-Type Jet Fuel	0	118,199	4,895	338	0	2,736	0	0	3,498	122,670	6,927
Kerosene	0	1,863	172	49	0	0	0	0	54	2,030	210
Distillate Fuel Oil	0	157,647	1,423	-516	0	8,338	0	0	12,097	154,795	11,990
Residual Fuel Oil	0	138,095	13,052	-861	0	0	0	0	52,183	98,103	9,175
Petrochemical Feedstocks[2]	0	5,583	966	-22	0	0	0	0	2,289	4,238	312
Special Naphthas	0	1,213	155	15	0	0	0	0	700	683	166
Lubricants	0	6,747	184	191	0	79	0	0	1,967	5,234	1,371
Waxes	0	802	90	9	0	0	0	0	97	804	95
Petroleum Coke	0	48,934	221	139	0	0	0	0	32,265	17,029	1,763
Asphalt and Road Oil	0	22,829	448	298	0	0	0	0	59	23,516	2,047
Still Gas	0	51,634	0	0	0	0	0	0	0	51,634	0
Miscellaneous Products	0	2,022	0	548	0	-31	0	0	6	2,530	321
Total	**1,164,585**	**1,028,502**	**113,044**	**5,872**	**7,161**	**-170,043**	**13**	**977,283**	**163,049**	**1,008,776**	**175,605**

[1] Unaccounted for crude oil is a balancing item.
[2] Includes naphtha less than 400 degrees F endpoint and other oils equal to or greater than 400 degrees F endpoint.
(s) = Less than 500 barrels.
Note: Total may not equal sum of components due to independent rounding.
Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 9. Production of Crude Oil by PAD District and State, 1988
(Thousand Barrels)

PAD District and State	Total	Daily Average
PAD District I, Total	**13,788**	**38**
Florida	7,748	21
New York	566	2
Pennsylvania	2,830	8
Virginia	25	(s)
West Virginia	2,621	7
PAD District II, Total	**301,993**	**825**
Illinois	22,476	61
Indiana	3,665	10
Kansas	58,824	161
Kentucky	5,458	15
Michigan	23,250	64
Missouri	156	(s)
Nebraska	5,978	16
North Dakota	39,343	107
Ohio	11,711	32
Oklahoma	128,874	352
South Dakota	1,657	5
Tennessee	601	2
PAD District III, Total	**1,333,149**	**3,642**
Alabama	20,797	57
Arkansas	13,606	37
Louisiana [1]	165,006	451
Mississippi	27,553	75
New Mexico	71,235	195
Texas [1]	735,495	2,010
Federal Offshore PAD District III	299,458	818
PAD District IV, Total	**202,692**	**554**
Colorado	32,352	88
Montana	23,338	64
Utah	33,018	90
Wyoming	113,985	311
PAD District V, Total	**1,127,501**	**3,081**
Alaska [1]	738,143	2,017
South Alaska	15,696	43
North Slope	722,447	1,974
Arizona	113	(s)
California [1]	354,730	969
Nevada	3,230	9
Federal Offshore PAD District V	31,284	85
U.S. Total [1]	**2,979,123**	**8,140**

[1] Includes the following offshore production (thousand barrels): Alaska: State - 50,671; California: State - 28,170; Louisiana: State - 24,672; Texas: State - 1,500; U.S. Total, including Federal Offshore - 435,955.

(s) = Less than 500 barrels or less than 500 barrels per day.

Note: • The EIA did not receive revised crude oil production data from the following states and/or areas in time for publication: Alabama, Arizona, California, Kentucky, North Dakota, and PAD District V Federal Offshore. • Annual crude oil production data for Pennsylvania was estimated based on first purchaser monthly crude oil volumes collected on Form EIA-182, "Domestic Crude Oil First Purchase Report." • A final revision to the State data for 1988 will appear in the 1989 *Petroleum Supply Annual*. • Totals may not equal sum of components due to independent rounding.

Source: State Conservation Agencies and the U.S. Minerals Management Service.

Revised 1987 crude oil production statistics are available in Appendix C, page 135.

Table 10. Natural Gas Processing Plant Net Production of Petroleum Products by PAD District, 1988
(Thousand Barrels)

Commodity	PAD District I			PAD District II				PAD District III						PAD Dist. IV	PAD Dist. V	United States
	East Coast	Appala-chian No.1	Total	Ind., Ill., Ky.	Minn., Wisc., Daks.	Okla., Kans., Mo.	Total	Texas Inland	Texas Gulf Coast	La. Gulf Coast	N. La., Ark.	New Mexico	Total	Rocky Mt.	West Coast	
Natural Gas Liquids	**2,967**	**7,004**	**9,971**	**8,996**	**5,244**	**97,056**	**111,296**	**224,498**	**34,446**	**82,922**	**7,638**	**44,196**	**393,702**	**45,816**	**32,498**	**593,283**
Pentanes Plus	527	857	1,384	1,717	1,329	14,216	17,262	40,893	2,711	14,761	2,115	5,698	66,178	9,223	16,660	110,707
Liquefied Petroleum Gases	2,440	6,147	8,587	7,279	3,915	82,840	94,034	183,605	31,735	68,161	5,523	38,500	327,524	36,593	15,838	482,576
Ethane	790	2,067	2,857	1,509	8	29,901	31,418	76,373	12,406	29,745	1,198	17,814	137,536	11,525	19	183,355
Propane	1,017	2,774	3,791	3,419	2,353	34,731	40,503	68,093	14,204	22,981	2,305	13,329	120,912	15,883	4,285	185,374
Normal Butane	526	934	1,460	1,218	1,478	11,882	14,578	28,480	-11,981	7,514	1,416	4,897	30,326	6,399	8,537	61,300
Isobutane	107	372	479	1,133	76	6,326	7,535	10,659	17,106	7,921	604	2,460	38,750	2,786	2,997	52,547
Finished Petroleum Products	**0**	**0**	**0**	**15**	**0**	**35**	**50**	**548**	**584**	**26**	**165**	**0**	**1,323**	**36**	**0**	**1,409**
Finished Motor Gasoline	0	0	0	0	0	0	0	12	105	0	0	0	117	0	0	117
Finished Leaded Motor Gasoline	0	0	0	0	0	0	0	0	105	0	0	0	105	0	0	105
Finished Unleaded Motor Gasoline	0	0	0	0	0	0	0	12	0	0	0	0	12	0	0	12
Finished Aviation Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Naphtha-Type Jet Fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kerosene-Type Jet Fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kerosene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Distillate Fuel Oil	0	0	0	0	0	0	0	0	479	23	0	0	502	0	0	502
Special Naphthas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous Products	0	0	0	15	0	35	50	536	0	3	165	0	704	36	0	790
Total Production	**2,967**	**7,004**	**9,971**	**9,011**	**5,244**	**97,091**	**111,346**	**225,046**	**35,030**	**82,948**	**7,803**	**44,198**	**395,025**	**45,852**	**32,498**	**594,692**

Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 11. Refinery Input of Crude Oil and Petroleum Products by PAD District, 1988
(Thousand Barrels, Except Where Noted)

Commodity	PAD District I			PAD District II				PAD District III						PAD Dist. IV	PAD Dist. V	United States
	East Coast	Appalachian No.1	Total	Ind., Ill., Ky.	Minn., Wisc., Daks.	Okla., Kans., Mo.	Total	Texas Inland	Texas Gulf Coast	La. Gulf Coast	N. La., Ark.	New Mexico	Total	Rocky Mt.	West Coast	
Crude Oil (including lease condensate)	**438,412**	**36,618**	**475,030**	**711,617**	**112,432**	**243,340**	**1,067,389**	**175,787**	**1,105,753**	**827,613**	**64,345**	**25,289**	**2,198,787**	**165,297**	**941,672**	**4,848,175**
Natural Gas Liquids																
Pentanes Plus	484	2	486	5,484	997	7,896	14,377	11,477	20,261	7,374	2,059	1,539	42,710	1,224	10,441	69,238
Liquefied Petroleum Gases	1,388	447	1,835	22,653	2,627	8,419	33,699	8,144	22,077	29,117	1,482	752	61,572	5,962	14,596	117,664
Ethane	0	0	0	0	0	0	0	0	21	800	0	0	821	0	0	821
Propane	1	0	1	905	0	0	905	7	1,537	576	0	14	2,134	18	47	3,105
Normal Butane	703	447	1,150	11,045	1,822	3,278	16,145	4,181	9,805	13,385	371	265	28,007	4,691	10,165	60,158
Isobutane	684	0	684	10,703	805	5,141	16,649	3,956	10,714	14,356	1,111	473	30,610	1,253	4,384	53,580
Other Liquids																
Other Hydrocarbons and Alcohol	412	0	412	3,324	18	172	3,514	1	5,450	5,041	37	254	10,783	221	4,585	19,515
Unfinished Oil (net)	61,317	2,597	63,914	2,659	-50	3,689	6,298	-433	88,939	10,177	271	-13	98,941	-1,686	5,100	172,567
Motor Gasoline Blending Components (net)	16,346	-205	16,141	11,940	-10	942	12,872	470	-5,916	5,708	281	33	576	562	858	31,009
Aviation Gasoline Blending Components (net)	0	0	0	279	0	-77	202	0	-16	1	0	0	-15	0	31	218
Total Input to Refineries	**518,359**	**39,459**	**557,818**	**757,956**	**116,014**	**264,381**	**1,138,351**	**195,446**	**1,236,548**	**885,031**	**68,475**	**27,854**	**2,413,354**	**171,580**	**977,283**	**5,258,386**
Crude Oil Distillation																
Gross Input (daily average)	1,197	100	1,297	1,953	308	667	2,928	483	3,057	2,310	173	69	6,092	455	2,675	13,447
Operable Capacity (daily average)	1,356	109	1,464	2,245	322	734	3,302	580	3,591	2,948	255	76	7,449	537	3,176	15,927
Operating Ratio (percent)[1]	88.3	92.0	88.5	87.0	95.5	90.8	88.7	83.2	85.1	78.4	68.1	91.4	81.8	84.7	84.2	84.4
Downstream Processing																
Fresh Feed Input (daily average)																
Catalytic Cracking	527	16	543	656	105	227	988	178	1,222	717	29	24	2,171	153	659	4,514
Catalytic Hydrocracking	52	1	53	114	0	5	119	7	171	176	1	0	356	5	397	931
Cokers	70	0	70	143	51	68	262	9	197	335	11	0	552	16	464	1,364
Crude Oil Qualities																
Sulfur Content, Weighted Average (percent)	1.08	.60	1.05	.99	2.08	.56	1.01	.78	.92	1.28	1.37	.82	1.06	.76	1.10	1.04
API Gravity, Weighted Average	30.62	38.66	31.24	34.91	29.75	37.17	34.88	38.42	33.81	31.08	33.64	40.24	33.22	36.09	25.33	31.93
Operable Capacity (daily average)	**1,356**	**109**	**1,464**	**2,245**	**322**	**734**	**3,302**	**580**	**3,591**	**2,948**	**255**	**76**	**7,449**	**537**	**3,176**	**15,927**
Operating	1,326	109	1,435	2,176	322	718	3,216	518	3,380	2,533	240	76	6,746	533	3,045	14,975
Idle	29	0	29	70	0	16	86	63	211	414	14	0	702	4	130	952
Alaskan Crude Oil Receipts	**13,859**	**0**	**13,859**	**16,644**	**0**	**2,162**	**18,806**	**0**	**60,072**	**53,053**	**2,051**	**0**	**115,176**	**0**	**498,501**	**646,342**

[1] Represents gross input divided by operable capacity.
(s) = Less than 500 barrels.
Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 12. Refinery Net Production of Petroleum Products by PAD District, 1988
(Thousand Barrels)

Commodity	PAD District I			PAD District II				PAD District III						PAD Dist. IV	PAD Dist. V	United States
	East Coast	Appala-chian No.1	Total	Ind., Ill., Ky.	Minn., Wisc., Daks.	Okla., Kans., Mo.	Total	Texas Inland	Texas Gulf Coast	La. Gulf Coast	N. La., Ark.	New Mexico	Total	Rocky Mt.	West Coast	
Liquefied Refinery Gases	19,845	336	20,181	24,310	2,950	4,691	31,951	3,295	50,023	48,492	1,182	1,067	104,059	3,367	23,053	182,611
Ethane	1,266	27	1,293	64	0	0	64	-536	2,535	30	0	0	2,029	0	422	3,808
Propane	15,673	309	15,982	24,162	2,686	5,546	32,394	4,991	37,138	22,821	962	740	66,652	2,402	13,225	130,655
Normal Butane	2,571	0	2,571	109	163	-890	-618	-3,201	9,876	25,388	220	254	32,537	1,009	7,854	43,353
Isobutane	335	0	335	-25	101	35	111	2,041	474	253	0	73	2,841	-44	1,552	4,795
Finished Motor Gasoline	244,405	14,132	258,537	421,266	60,085	144,988	626,339	106,182	586,140	416,266	20,774	15,429	1,144,791	87,379	428,722	2,545,768
Finished Leaded Motor Gasoline	22,765	2,685	25,450	55,527	12,458	44,170	112,155	29,050	87,306	74,170	3,902	5,313	199,741	31,558	107,666	476,570
Finished Unleaded Motor Gasoline	221,640	11,447	233,087	365,739	47,627	100,818	514,184	77,132	498,834	342,096	16,872	10,116	945,050	55,821	321,056	2,069,198
Finished Aviation Gasoline	108	0	108	871	167	181	1,219	1,490	2,538	1,569	0	0	5,597	277	2,096	9,297
Naphtha-Type Jet Fuel	8,825	0	8,825	4,432	281	3,093	7,806	9,218	11,455	8,691	2,318	3,048	34,730	4,969	19,063	75,393
Kerosene-Type Jet Fuel	25,158	-3	25,155	42,130	5,616	14,536	62,282	12,332	100,091	96,795	1,447	507	211,172	9,122	118,199	425,930
Kerosene	1,685	944	2,629	5,480	519	255	6,254	379	12,348	5,005	228	0	17,960	64	1,863	28,770
Distillate Fuel Oil	109,500	12,451	121,951	152,393	28,491	64,812	245,696	41,073	235,578	176,056	18,392	5,944	477,043	43,449	157,647	1,045,786
Residual Fuel Oil	51,648	940	52,588	21,103	3,190	1,910	26,203	2,943	65,106	46,236	3,399	153	117,837	4,011	138,095	338,734
Naphtha < 400 Deg. for Petro. Feed. Use	3,139	0	3,139	5,135	0	1,157	6,292	1,496	25,783	1,078	406	1	28,764	32	1,998	40,225
Other Oils > 400 Deg. for Petro. Feed. Use	100	0	100	7,389	0	717	8,106	1,695	48,989	19,705	0	0	70,389	86	3,585	82,266
Special Naphthas	1,332	272	1,604	2,008	0	1,759	3,767	1,123	11,603	540	1,939	0	15,205	-16	1,213	21,773
Lubricants	4,256	4,406	8,662	5,748	0	3,834	9,582	307	24,043	7,641	5,027	0	37,018	282	6,747	62,291
Waxes	0	1,022	1,022	223	0	381	604	148	1,848	687	633	0	3,316	422	802	6,166
Petroleum Coke	15,419	258	15,677	27,267	6,389	8,767	42,423	4,110	40,124	42,035	1,584	239	88,092	3,930	48,934	199,056
Marketable	4,120	0	4,120	15,204	4,744	5,556	25,504	518	19,496	31,912	1,002	0	52,928	1,681	36,645	120,878
Catalyst	11,299	258	11,557	12,063	1,645	3,211	16,919	3,592	20,628	10,123	582	239	35,164	2,249	12,289	78,178
Asphalt and Road Oil	32,081	2,650	34,731	34,450	9,270	10,446	54,166	4,928	9,305	14,913	9,791	1,118	40,055	10,285	22,829	162,066
Still Gas	21,570	1,898	23,468	34,945	4,144	12,015	51,104	8,842	61,985	38,042	2,075	1,009	111,953	7,192	51,634	245,351
Miscellaneous Products	4,471	556	5,027	3,330	467	729	4,526	280	8,434	5,661	0	0	14,375	713	2,022	26,663
Fuel Use	137	4	141	0	0	0	0	34	0	470	0	0	504	0	29	674
Non-Fuel Use	4,334	552	4,886	3,330	467	729	4,526	246	8,434	5,191	0	0	13,871	713	1,993	25,989
Total Production	**543,542**	**39,862**	**583,404**	**792,480**	**121,569**	**274,271**	**1,188,320**	**199,841**	**1,295,393**	**929,412**	**69,195**	**28,515**	**2,522,356**	**175,564**	**1,028,502**	**5,498,146**
Processing Gain(-) or Loss(+)[1]	-25,183	-403	-25,586	-34,524	-5,555	-9,890	-49,969	-4,395	-58,845	-44,381	-720	-661	-109,002	-3,984	-51,219	-239,760

1 Represents the arithmetic difference between input and output.
Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 13. Percent Refinery Yield of Petroleum Products by PAD District,[1] 1988

Commodity	PAD District I			PAD District II				PAD District III						PAD Dist. IV	PAD Dist. V	United States
	East Coast	Appala-chian No.1	Total	Ind., Ill., Ky.	Minn., Wisc., Daks.	Okla., Kans., Mo.	Total	Texas Inland	Texas Gulf Coast	La. Gulf Coast	N. La., Ark.	New Mexico	Total	Rocky Mt.	West Coast	
Liquefied Refinery Gases	4.0	0.9	3.7	3.4	2.6	1.9	3.0	1.9	4.2	5.8	1.8	4.2	4.5	2.1	2.4	3.6
Finished Motor Gasoline[2]	45.2	35.4	44.5	52.9	50.2	51.6	52.3	49.1	45.6	44.0	26.2	50.8	44.8	48.5	42.1	46.0
Finished Aviation Gasoline[3]	.0	.0	.0	.1	.1	.1	.1	.8	.2	.2	.0	.0	.2	.2	.2	.2
Naphtha-Type Jet Fuel	1.8	0	1.6	.6	.3	1.3	.7	5.3	1.0	1.0	3.6	12.1	1.5	3.0	2.0	1.5
Kerosene-Type Jet Fuel	5.0	.0	4.7	5.9	5.0	5.9	5.8	7.0	8.4	11.6	2.2	2.0	9.2	5.6	12.5	8.5
Kerosene	.3	2.4	.5	.8	.5	.1	.6	.2	1.0	.6	.4	0	.8	.0	.2	.6
Distillate Fuel Oil	21.9	31.8	22.6	21.3	25.4	26.2	22.9	23.4	19.7	21.0	28.5	23.5	20.8	26.6	16.7	20.8
Residual Fuel Oil	10.3	2.4	9.8	3.0	2.8	.8	2.4	1.7	5.4	5.5	5.3	.6	5.1	2.5	14.6	6.7
Naphtha < 400 Deg. for Petro. Feed. Use	.6	0	.6	.7	0	.5	.6	.9	2.2	1	.6	.0	1.3	.0	.2	.8
Other Oils > 400 Deg. for Petro. Feed. Use	.0	0	.0	1.0	0	.3	.8	1.0	4.1	2.4	0	0	3.1	.1	.4	1.6
Special Naphthas	.3	.7	.3	.3	0	.7	.4	.6	1.0	1	3.0	0	.7	.0	.1	.4
Lubricants	.9	11.2	1.6	.8	0	1.6	.9	.2	2.0	.9	7.8	0	1.6	.2	.7	1.2
Waxes	0	2.6	.2	.0	0	.2	.1	.1	.2	.1	1.0	0	.1	.3	.1	.1
Petroleum Coke	3.1	.7	2.9	3.8	5.7	3.5	4.0	2.3	3.4	5.0	2.5	.9	3.8	2.4	5.2	4.0
Asphalt and Road Oil	6.4	6.8	6.4	4.6	8.2	4.2	5.0	2.8	.8	1.8	15.2	4.4	1.7	6.3	2.4	3.2
Still Gas	4.3	4.8	4.4	4.9	3.7	4.9	4.8	5.0	5.2	4.5	3.2	4.0	4.9	4.4	5.5	4.9
Miscellaneous Products	.9	1.4	.9	.5	.4	.3	.4	.2	.7	.7	.0	0	.6	.4	.2	.5
Processing Gain(-) or Loss(+)[4]	-5.0	-1.0	-4.7	-4.8	-4.9	-4.0	-4.7	-2.5	-4.9	-5.3	-1.1	-2.6	-4.7	-2.4	-5.4	-4.8

1 Based on crude oil input and net reruns of unfinished oils.
2 Based on total finished motor gasoline output plus net output of motor gasoline blending components, minus input of natural gas plant liquids, other hydrocarbons and alcohol.
3 Based on finished aviation gasoline output plus net output of aviation gasoline blending components.
4 Represents the difference between Input and Production.
Note: Total may not equal sum of components due to independent rounding.
Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 14. Imports of Crude Oil and Petroleum Products by PAD District, 1988
(Thousand Barrels)

Commodity	Petroleum Administration for Defense Districts						Total (Daily Average)
	I	II	III	IV	V	Total	
Crude Oil (including lease condensate) [1] [2]	**429,968**	**346,950**	**994,969**	**23,456**	**73,642**	**1,869,005**	**5,107**
Natural Gas Liquids	**16,693**	**33,051**	**22,410**	**4,840**	**3,823**	**80,816**	**221**
Pentanes plus	3,100	411	322	345	0	4,178	11
Liquefied Petroleum Gases	13,593	32,640	22,088	4,495	3,823	76,638	209
Ethane	227	232	743	1	38	1,240	3
Propane	8,206	21,223	6,451	2,317	567	38,764	106
Normal Butane	3,354	7,270	9,630	1,415	2,089	23,759	65
Isobutane	1,806	3,915	5,264	762	1,128	12,874	35
Other Liquids [1]	**62,815**	**1,146**	**85,416**	**0**	**3,192**	**152,569**	**417**
Unfinished Oils [1]	44,892	1,105	82,730	0	2,872	131,599	360
Naphthas and Lighter	2,169	238	18,355	0	874	21,636	59
Kerosene and Light Gas Oils	217	0	2,284	0	0	2,501	7
Heavy Gas Oils	34,638	499	14,100	0	1,754	50,991	139
Residuum	7,868	368	47,991	0	244	56,471	154
Motor Gasoline Blending Components	17,923	41	2,686	0	320	20,970	57
Aviation Gasoline Blending Components	0	0	0	0	0	0	0
Finished Petroleum Products	**491,390**	**12,629**	**68,378**	**1,965**	**32,387**	**606,750**	**1,658**
Finished Motor Gasoline	132,498	1,491	3,218	573	10,592	148,372	405
Finished Leaded Motor Gasoline	3,189	30	39	30	278	3,566	10
Finished Unleaded Motor Gasoline	129,309	1,461	3,179	543	10,314	144,806	396
Finished Aviation Gasoline	0	0	39	0	156	195	1
Naphtha-Type Jet Fuel	0	1,018	0	0	33	1,051	3
Kerosene-Type Jet Fuel	20,770	4,494	1,718	0	4,895	31,878	87
Bonded Aircraft Fuel	11,112	4,494	966	0	3,343	19,916	54
Other	9,658	0	752	0	1,552	11,962	33
Kerosene	3,379	0	2,150	0	172	5,701	16
Distillate Fuel Oil	104,576	2,090	913	1,352	1,423	110,354	302
Bonded Ships Bunkers	0	0	0	0	0	0	0
Other	104,576	2,090	913	1,352	1,423	110,354	302
Residual Fuel Oil	212,374	1,873	8,554	7	13,052	235,860	644
Bonded Ships Bunkers	0	0	0	0	0	0	0
Other	212,374	1,873	8,554	7	13,052	235,860	644
Naphtha < 400 Deg. for Petro. Feed. Use	2,553	174	26,372	0	442	29,541	81
Other Oils > 400 Deg. for Petro. Feed. Use	228	0	23,248	0	524	24,000	66
Special Naphthas	458	677	1,112	1	155	2,403	7
Lubricants	3,358	175	220	0	184	3,937	11
Waxes	340	172	18	11	90	631	2
Petroleum Coke	41	0	345	0	221	607	2
Asphalt and Road Oil	10,239	403	412	21	448	11,523	31
Miscellaneous Products	576	62	59	0	0	697	2
Total Imports	**1,000,866**	**393,776**	**1,171,193**	**30,261**	**113,044**	**2,709,140**	**7,402**

1 Crude oil and unfinished oils are reported by the PAD District in which they are to be processed; all other products are reported by the PAD District of entry.
2 Includes crude oil imported for storage in the Strategic Petroleum Reserve.
(s) = Less than 500 barrels.
Note: Total may not equal sum of components due to independent rounding.
Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 15. Imports of Crude Oil and Petroleum Products by Source and PAD District,[1] 1988
(Thousand Barrels)

Source	Crude Oil [2]	LPG	Unfinished Oils	Gasoline Blending Components	Finished Motor Gasoline	Jet Fuel	Kerosene	Distil. Fuel Oil	Resid. Fuel Oil	Special Naphthas	Other Products [3]	Total Products	Total Petroleum	Total (Daily Average)
	All PAD Districts													
Arab OPEC														
Algeria	21,123	9,524	8,801	0	0	313	0	6,466	22,206	0	41,408	88,718	109,841	300
Iraq	125,515	0	930	0	0	0	0	0	0	0	0	930	126,445	345
Kuwait	29,381	790	3,155	0	0	46	0	0	130	0	0	4,121	33,502	92
Neutral Zone[4]	3,274	0	0	0	0	0	0	0	0	0	0	0	3,274	9
Saudi Arabia	330,194	7,221	33,715	386	7,840	3,720	325	5,002	522	0	660	59,391	389,585	1,064
United Arab Emirates	8,270	482	573	0	0	592	0	342	0	0	213	2,202	10,472	29
Subtotal Arab OPEC	517,757	18,017	47,174	386	7,840	4,671	325	11,810	22,858	0	42,281	155,362	673,119	1,839
Other OPEC														
Ecuador	12,240	0	0	0	0	0	0	0	5,074	0	0	5,074	17,314	47
Gabon	5,664	0	0	0	0	0	0	0	323	0	0	323	5,987	16
Indonesia	68,127	0	1,176	0	0	0	0	0	5,086	0	560	6,822	74,949	205
Iran	5 25	0	0	0	0	0	0	0	0	0	0	0	5 25	5 (s)
Nigeria	222,094	0	603	0	0	0	0	256	3,217	0	0	4,076	226,170	618
Venezuela	160,747	2,298	19,952	2,513	17,824	8,958	0	34,136	36,379	38	7,792	129,891	290,638	794
Subtotal Other OPEC	468,897	2,298	21,731	2,513	17,824	8,958	0	34,392	50,079	38	8,352	146,186	615,083	1,681
Other														
Albania	0	0	0	0	120	0	0	0	0	0	0	120	120	(s)
Angola	74,325	0	0	0	0	0	0	0	3,120	0	0	3,120	77,445	212
Argentina	1,277	0	0	18	771	0	0	0	2,599	336	160	3,884	5,161	14
Australia	21,669	318	0	0	0	0	0	0	1,146	0	131	1,595	23,264	64
Bahama Islands	0	0	100	0	250	0	0	464	10,876	0	0	11,690	11,690	32
Bahrain	0	0	275	0	0	0	0	0	519	0	0	794	794	2
Belgium	0	0	4,261	208	1,642	0	0	0	2,376	0	38	8,525	8,525	23
Benin	1,326	0	0	0	0	0	0	0	0	0	0	0	1,326	4
Bermuda	0	0	8	0	0	0	0	0	0	0	0	8	8	(s)
Brazil	0	548	15	101	26,824	0	219	1,495	6,509	87	149	35,947	35,947	98
Brunei	469	0	0	0	0	0	0	0	0	0	0	0	469	1
Cameroon	13,691	0	0	0	0	0	0	0	2,234	0	0	2,234	15,925	44
Canada	249,077	45,423	2,950	96	18,193	3,505	487	24,916	14,842	1,547	4,734	116,693	365,770	999
Chile	0	0	0	0	0	0	0	186	210	0	0	396	396	1
China, People's Republic	30,092	1	0	307	1,319	0	0	158	0	0	260	2,045	32,137	88
China, Taiwan	0	47	0	0	0	0	0	0	0	0	116	163	163	(s)
Colombia	38,640	0	0	0	0	0	0	362	10,175	0	0	10,537	49,177	134
Congo	10,747	0	0	0	0	0	0	0	1,098	0	0	1,098	11,845	32
Egypt	9,560	0	0	0	0	0	0	0	350	0	10	360	9,920	27
Finland	0	78	0	0	292	0	0	0	0	0	0	370	370	1
France	0	159	639	0	4,577	0	0	0	2,281	0	177	7,833	7,833	21
Germany, DR (E)	0	0	0	0	0	0	0	944	0	0	0	944	944	3
Germany, FD (W)	0	14	611	0	310	0	0	0	827	32	58	1,652	1,852	5
Ghana	0	0	151	0	0	0	0	0	435	0	0	586	586	2
Greece	0	0	239	0	3,022	251	0	767	3,621	0	0	7,900	7,900	22
Guatemala	1,083	0	0	0	0	0	0	0	0	0	0	0	1,083	3
Hong Kong	0	(s)	0	0	0	0	0	0	0	0	0	(s)	(s)	(s)
Hungary	0	0	0	0	0	0	0	0	0	0	5	5	5	(s)
India	100	0	7,352	0	0	0	0	0	0	0	3,277	10,629	10,729	29
Ireland	0	0	174	0	0	0	0	0	203	0	0	377	377	1
Israel	0	0	0	0	1,360	0	0	0	0	36	0	1,396	1,396	4
Italy	1,883	1	7,266	55	10,072	587	0	981	2,146	22	730	21,859	23,742	65

See footnotes at end of table.

Table 15. Imports of Crude Oil and Petroleum Products by Source and PAD District,[1] 1988 (continued)
(Thousand Barrels)

Source	Crude Oil [2]	LPG	Unfinished Oils	Gasoline Blending Components	Finished Motor Gasoline	Jet Fuel	Kerosene	Distil. Fuel Oil	Resid. Fuel Oil	Special Naphthas	Other Products [3]	Total Products	Total Petroleum	Total (Daily Average)
							All PAD Districts (continued)							
Other (continued)														
Japan	0	21	0	0	0	0	0	57	0	80	524	682	682	2
Korea, Republic	0	12	0	0	76	258	0	0	0	0	262	608	608	2
Liberia	0	0	0	0	0	0	0	210	0	0	0	210	210	1
Malaysia	6,868	0	0	0	0	0	0	67	126	0	0	193	7,061	19
Malta	0	(s)	0	0	0	0	0	0	0	0	0	(s)	(s)	(s)
Mauritania	0	0	0	0	0	0	0	0	245	0	0	245	245	1
Mexico	246,545	9,051	0	440	1,111	5,258	0	1,520	6,362	0	3,083	26,825	273,370	747
Netherlands Antilles	0	12	388	310	1,322	70	0	1,113	9,721	0	143	13,079	13,079	36
Netherlands	0	16	2,796	81	12,822	0	189	2,879	2,897	146	429	22,255	22,255	61
Norway	22,570	0	488	0	0	0	0	0	894	0	569	1,951	24,521	67
Oman	2,439	0	1,248	0	0	0	0	0	0	0	0	1,248	3,687	10
Panama	0	1	0	0	0	0	0	0	10	0	0	11	11	(s)
Peru	1,849	0	0	0	0	0	0	0	10,336	0	0	10,336	12,185	33
Philippines	0	74	0	0	0	0	0	0	0	0	0	74	74	(s)
Portugal	0	0	0	22	801	0	0	0	843	0	93	1,759	1,759	5
Puerto Rico	0	0	1,798	0	0	0	0	0	0	0	6,366	8,164	8,164	22
Romania	0	0	0	12,227	5,445	0	0	1,963	1,494	3	0	21,132	21,132	58
Singapore	0	0	901	13	146	1,391	0	79	7,964	0	10	10,504	10,504	29
South Africa	0	0	0	0	0	0	0	210	210	0	133	553	553	2
Spain	0	71	3,588	142	12,829	2,220	0	882	3,174	0	1,994	24,900	24,900	68
Sweden	0	2	146	0	204	0	0	372	3,781	0	307	4,812	4,812	13
Switzerland	0	(s)	413	0	0	0	0	0	0	0	2	415	415	1
Syria	2,859	0	690	0	0	0	0	0	352	0	0	1,042	3,901	11
Thailand	4,055	0	0	0	0	0	0	0	0	0	0	0	4,055	11
Togo	0	0	0	0	0	0	0	0	87	0	0	87	87	(s)
Trinidad and Tobago	26,119	0	0	0	617	724	115	1,180	6,868	0	11	9,515	35,634	97
Tunisia	0	0	220	0	0	0	0	0	392	0	0	612	612	2
Turkey	0	84	1,878	0	0	0	0	0	230	0	539	2,731	2,731	7
United Kingdom	92,910	391	2,296	0	7,773	244	0	2,154	9,242	68	366	22,534	115,444	315
U.S.S.R.	0	0	2,826	0	395	0	0	4,230	3,067	8	0	10,526	10,526	29
Virgin Islands	0	0	18,977	4,051	10,415	4,792	4,366	16,963	28,917	0	0	88,481	88,481	242
Yemen (Sanaa)	10,728	0	0	0	0	0	0	0	0	0	0	0	10,728	29
Zaire	11,470	0	0	0	0	0	0	0	144	0	0	144	11,614	32
Subtotal Other	**882,351**	**56,323**	**62,694**	**18,071**	**122,708**	**19,300**	**5,376**	**64,152**	**162,923**	**2,365**	**24,676**	**538,587**	**1,420,938**	**3,882**
Total Imports	1,869,005	76,638	131,599	20,970	148,372	32,929	5,701	110,354	235,860	2,403	75,309	840,135	2,709,140	7,402
							PAD District I							
Arab OPEC														
Algeria	0	5,036	7,735	0	0	313	0	6,466	20,024	0	0	39,574	39,574	108
Iraq	8,148	0	0	0	0	0	0	0	0	0	0	0	8,148	22
Kuwait	391	0	0	0	0	0	0	0	130	0	0	130	521	1
Neutral Zone[4]	650	0	0	0	0	0	0	0	0	0	0	0	650	2
Saudi Arabia	43,736	2,239	355	386	5,997	2,842	325	5,002	274	0	0	17,420	61,156	167
United Arab Emirates	1,427	0	0	0	0	0	0	342	0	0	0	342	1,769	5
Subtotal Arab OPEC	54,352	7,275	8,090	386	5,997	3,155	325	11,810	20,428	0	0	57,466	111,818	306

See footnotes at end of table.

Table 15. Imports of Crude Oil and Petroleum Products by Source and PAD District,[1] 1988 (continued)
(Thousand Barrels)

Source	Crude Oil [2]	LPG	Unfinished Oils	Gasoline Blending Components	Finished Motor Gasoline	Jet Fuel	Kerosene	Distil. Fuel Oil	Resid. Fuel Oil	Special Naphthas	Other Products [3]	Total Products	Total Petroleum	Total (Daily Average)
	PAD District I (continued)													
Other OPEC														
Ecuador	7,533	0	0	0	0	0	0	0	4,893	0	0	4,893	12,426	34
Gabon	2,551	0	0	0	0	0	0	0	323	0	0	323	2,874	8
Indonesia	2,751	0	0	0	0	0	0	0	1,575	0	0	1,575	4,326	12
Nigeria	114,812	0	0	0	0	0	0	256	3,217	0	0	3,473	118,285	323
Venezuela	40,367	1,058	4,806	1,094	15,419	6,961	0	34,134	36,129	4	6,941	106,546	146,913	401
Subtotal Other OPEC	168,014	1,058	4,806	1,094	15,419	6,961	0	34,390	46,137	4	6,941	116,810	284,824	778
Other														
Angola	37,686	0	0	0	0	0	0	0	3,120	0	0	3,120	40,806	111
Argentina	1,277	0	0	18	601	0	0	0	2,599	57	0	3,275	4,552	12
Australia	1,298	0	0	0	0	0	0	0	182	0	80	262	1,560	4
Bahama Islands	0	0	0	0	0	0	0	464	10,649	0	0	11,113	11,113	30
Bahrain	0	0	0	0	0	0	0	0	519	0	0	519	519	1
Belgium	0	0	1,619	0	1,642	0	0	0	2,376	0	0	5,637	5,637	15
Benin	1,013	0	0	0	0	0	0	0	0	0	0	0	1,013	3
Brazil	0	0	15	26	25,055	0	219	1,495	6,509	17	140	33,476	33,476	91
Cameroon	7,179	0	0	0	0	0	0	0	2,234	0	0	2,234	9,413	26
Canada	24,059	5,171	591	15	13,810	2,099	315	19,849	11,772	116	2,152	55,890	79,949	218
Chile	0	0	0	0	0	0	0	186	210	0	0	396	396	1
China, People's Republic	11,450	0	0	0	0	0	0	0	0	0	114	114	11,564	32
China, Taiwan	0	30	0	0	0	0	0	0	0	0	0	30	30	(s)
Colombia	8,239	0	0	0	0	0	0	362	10,175	0	0	10,537	18,776	51
Congo	2,353	0	0	0	0	0	0	0	1,098	0	0	1,098	3,451	9
Egypt	7,737	0	0	0	0	0	0	0	350	0	5	355	8,092	22
Finland	0	0	0	0	292	0	0	0	0	0	0	292	292	1
France	0	24	0	0	3,888	0	0	0	2,281	0	54	6,247	6,247	17
Germany, DR (E)	0	0	0	0	0	0	0	944	0	0	0	944	944	3
Germany, FD (W)	0	13	0	0	310	0	0	0	827	28	24	1,202	1,202	3
Ghana	0	0	133	0	0	0	0	0	435	0	0	568	568	2
Greece	0	0	0	0	3,022	251	0	767	3,621	0	0	7,661	7,661	21
Hungary	0	0	0	0	0	0	0	0	0	0	5	5	5	(s)
India	0	0	569	0	0	0	0	0	0	0	0	569	569	2
Ireland	0	0	0	0	0	0	0	0	203	0	0	203	203	1
Israel	0	0	0	0	1,360	0	0	0	0	0	0	1,360	1,360	4
Italy	1,532	1	3,745	55	10,072	37	0	981	2,146	18	24	17,079	18,611	51
Japan	0	1	0	0	0	0	0	0	0	8	92	101	101	(s)
Korea, Republic	0	6	0	0	0	0	0	0	0	0	0	6	6	(s)
Liberia	0	0	0	0	0	0	0	210	0	0	0	210	210	1
Malaysia	0	0	0	0	0	0	0	67	0	0	0	67	67	(s)
Mauritania	0	0	0	0	0	0	0	0	245	0	0	245	245	1
Mexico	29,936	0	0	0	309	1,316	0	1,420	2,966	0	2,531	8,542	38,478	105
Netherlands Antilles	0	0	0	0	697	70	0	1,113	9,721	0	84	11,685	11,685	32
Netherlands	0	6	2,638	81	11,770	0	189	2,875	2,897	131	55	20,642	20,642	56
Norway	15,013	0	213	0	0	0	0	0	894	0	569	1,676	16,689	46
Oman	839	0	0	0	0	0	0	0	0	0	0	0	839	2
Panama	0	0	0	0	0	0	0	0	10	0	0	10	10	(s)
Peru	720	0	0	0	0	0	0	0	10,336	0	0	10,336	11,056	30
Portugal	0	0	0	0	577	0	0	0	843	0	0	1,420	1,420	4
Puerto Rico	0	0	1,695	0	0	0	0	0	0	0	5,513	7,208	7,208	20

See footnotes at end of table.

Table 15. Imports of Crude Oil and Petroleum Products by Source and PAD District,[1] 1988 (continued)
(Thousand Barrels)

Source	Crude Oil [2]	LPG	Unfinished Oils	Gasoline Blending Components	Finished Motor Gasoline	Jet Fuel	Kerosene	Distil. Fuel Oil	Resid. Fuel Oil	Special Naphthas	Other Products [3]	Total Products	Total Petroleum	Total (Daily Average)
PAD District I (continued)														
Other (continued)														
Romania	0	0	0	12,055	5,445	0	0	1,963	1,181	3	0	20,647	20,647	56
Singapore	0	0	0	0	0	0	0	0	1,017	0	0	1,017	1,017	3
South Africa	0	0	0	0	0	0	0	210	210	0	73	493	493	1
Spain	0	2	1,346	142	12,828	1,683	0	571	3,173	0	1,875	21,620	21,620	59
Sweden	0	1	146	0	204	0	0	372	3,781	0	0	4,504	4,504	12
Switzerland	0	(s)	0	0	0	0	0	0	0	0	2	2	2	(s)
Syria	2,859	0	690	0	0	0	0	0	352	0	0	1,042	3,901	11
Togo	0	0	0	0	0	0	0	0	87	0	0	87	87	(s)
Trinidad and Tobago	5,479	0	0	0	617	391	115	1,180	6,868	0	11	9,182	14,661	40
Tunisia	0	0	0	0	0	0	0	0	392	0	0	392	392	1
Turkey	0	0	0	0	0	0	0	0	230	0	0	230	230	1
United Kingdom	40,723	4	467	0	7,773	244	0	2,154	8,627	68	91	19,428	60,151	164
U.S.S.R.	0	0	0	0	395	0	0	4,230	1,612	8	0	6,245	6,245	17
Virgin Islands	0	0	18,129	4,051	10,415	4,563	2,216	16,963	28,917	0	0	85,254	85,254	233
Yemen (Sanaa)	2,713	0	0	0	0	0	0	0	0	0	0	0	2,713	7
Zaire	5,497	0	0	0	0	0	0	0	144	0	0	144	5,641	15
Subtotal Other	**207,602**	**5,259**	**31,996**	**16,443**	**111,082**	**10,654**	**3,054**	**58,376**	**145,809**	**454**	**13,494**	**396,621**	**604,223**	**1,651**
Total Imports	429,968	13,593	44,892	17,923	132,498	20,770	3,379	104,576	212,374	458	20,435	570,898	1,000,866	2,735
PAD District II														
Arab OPEC														
Algeria	5,005	0	0	0	0	0	0	0	0	0	0	0	5,005	14
Iraq	12,988	0	0	0	0	0	0	0	0	0	0	0	12,988	35
Kuwait	656	0	0	0	0	0	0	0	0	0	0	0	656	2
Saudi Arabia	53,702	0	0	0	0	0	0	0	0	0	0	0	53,702	147
United Arab Emirates	177	0	0	0	0	592	0	0	0	0	0	592	769	2
Subtotal Arab OPEC	72,528	0	0	0	0	592	0	0	0	0	0	592	73,120	200
Other OPEC														
Ecuador	1,565	0	0	0	0	0	0	0	0	0	0	0	1,565	4
Indonesia	659	0	0	0	0	0	0	0	0	0	0	0	659	2
Nigeria	38,718	0	0	0	0	0	0	0	0	0	0	0	38,718	106
Venezuela	2,814	0	634	0	0	1,273	0	0	0	0	0	1,907	4,721	13
Subtotal Other OPEC	43,756	0	634	0	0	1,273	0	0	0	0	0	1,907	45,663	125
Other														
Cameroon	417	0	0	0	0	0	0	0	0	0	0	0	417	1
Canada	192,582	32,597	0	41	1,491	1,018	0	2,086	1,873	677	1,227	41,010	233,592	638
Colombia	1,447	0	0	0	0	0	0	0	0	0	0	0	1,447	4
Congo	480	0	0	0	0	0	0	0	0	0	0	0	480	1
Egypt	935	0	0	0	0	0	0	0	0	0	0	0	935	3
France	0	34	0	0	0	0	0	0	0	0	0	34	34	(s)
Italy	0	0	0	0	0	132	0	0	0	0	0	132	132	(s)
Japan	0	1	0	0	0	0	0	0	0	0	0	1	1	(s)
Mexico	19,967	0	0	0	0	1,913	0	0	0	0	0	1,913	21,880	60
Netherlands	0	0	0	0	0	0	0	4	0	0	0	4	4	(s)

See footnotes at end of table.

Table 15. Imports of Crude Oil and Petroleum Products by Source and PAD District,[1] 1988 (continued)
(Thousand Barrels)

Source	Crude Oil [2]	LPG	Unfinished Oils	Gasoline Blending Components	Finished Motor Gasoline	Jet Fuel	Kerosene	Distil. Fuel Oil	Resid. Fuel Oil	Special Naphthas	Other Products [3]	Total Products	Total Petroleum	Total (Daily Average)
PAD District II (continued)														
Other (continued)														
Norway	447	0	0	0	0	0	0	0	0	0	0	0	447	1
Peru	1,129	0	0	0	0	0	0	0	0	0	0	0	1,123	3
Puerto Rico	0	0	103	0	0	0	0	0	0	0	0	103	103	(s)
South Africa	0	0	0	0	0	0	0	0	0	0	51	51	51	(s)
Spain	0	0	0	0	0	251	0	0	0	0	119	370	370	1
Sweden	0	1	0	0	0	0	0	0	0	0	0	1	1	(s)
Trinidad and Tobago	176	0	0	0	0	333	0	0	0	0	0	333	509	1
United Kingdom	7,612	8	368	0	0	0	0	0	0	0	0	376	7,988	22
Yemen (Sanaa)	4,178	0	0	0	0	0	0	0	0	0	0	0	4,178	11
Zaire	1,296	0	0	0	0	0	0	0	0	0	0	0	1,296	4
Subtotal Other	**230,666**	**32,640**	**471**	**41**	**1,491**	**3,647**	**0**	**2,090**	**1,873**	**677**	**1,397**	**44,327**	**274,993**	**751**
Total Imports	346,950	32,640	1,105	41	1,491	5,512	0	2,090	1,873	677	1,397	46,826	393,776	1,076
PAD District III														
Arab OPEC														
Algeria	16,118	4,488	1,066	0	0	0	0	0	2,182	0	41,408	49,144	65,262	178
Iraq	104,379	0	930	0	0	0	0	0	0	0	0	930	105,309	288
Kuwait	28,334	790	3,155	0	0	0	0	0	0	0	0	3,945	32,279	88
Neutral Zone[4]	2,624	0	0	0	0	0	0	0	0	0	0	0	2,624	7
Saudi Arabia	232,756	4,981	33,360	0	0	0	0	0	248	0	660	39,249	272,005	743
United Arab Emirates	5,979	482	573	0	0	0	0	0	0	0	213	1,268	7,247	20
Subtotal Arab OPEC	390,190	10,741	39,084	0	0	0	0	0	2,430	0	42,281	94,536	484,726	1,324
Other OPEC														
Ecuador	2,851	0	0	0	0	0	0	0	0	0	0	0	2,851	8
Gabon	3,113	0	0	0	0	0	0	0	0	0	0	0	3,113	9
Indonesia	20,400	0	922	0	0	0	0	0	0	0	36	958	21,358	58
Iran	[5] 25	0	0	0	0	0	0	0	0	0	0	0	[5] 25	[5] (s)
Nigeria	68,564	0	603	0	0	0	0	0	0	0	0	603	69,167	189
Venezuela	117,566	1,240	14,512	1,419	1,910	0	0	2	250	34	640	20,007	137,573	376
Subtotal Other OPEC	212,519	1,240	16,037	1,419	1,910	0	0	2	250	34	676	21,568	234,087	640
Other														
Angola	36,639	0	0	0	0	0	0	0	0	0	0	0	36,639	100
Argentina	0	0	0	0	0	0	0	0	0	279	160	439	439	1
Australia	9,218	0	0	0	0	0	0	0	0	0	51	51	9,269	25
Bahama Islands	0	0	100	0	0	0	0	0	227	0	0	327	327	1
Bahrain	0	0	275	0	0	0	0	0	0	0	0	275	275	1
Belgium	0	0	2,642	208	0	0	0	0	0	0	38	2,888	2,888	8
Benin	313	0	0	0	0	0	0	0	0	0	0	0	313	1
Bermuda	0	0	8	0	0	0	0	0	0	0	0	8	8	(s)
Brazil	0	548	0	75	747	0	0	0	0	70	9	1,449	1,449	4
Cameroon	6,095	0	0	0	0	0	0	0	0	0	0	0	6,095	17
Canada	3,510	1	1,739	40	0	0	0	600	701	598	561	4,240	7,750	21
China, People's Republic	16,051	0	0	0	0	0	0	0	0	0	146	146	16,197	44
Colombia	28,954	0	0	0	0	0	0	0	0	0	0	0	28,954	79

See footnotes at end of table.

Table 15. Imports of Crude Oil and Petroleum Products by Source and PAD District,[1] 1988 (continued)
(Thousand Barrels)

Source	Crude Oil [2]	LPG	Unfinished Oils	Gasoline Blending Components	Finished Motor Gasoline	Jet Fuel	Kerosene	Distil. Fuel Oil	Resid. Fuel Oil	Special Naphthas	Other Products [3]	Total Products	Total Petroleum	Total (Daily Average)
							PAD District III (continued)							
Other (continued)														
Congo	7,914	0	0	0	0	0	0	0	0	0	0	0	7,914	22
Egypt	888	0	0	0	0	0	0	0	0	0	5	5	893	2
Finland	0	78	0	0	0	0	0	0	0	0	0	78	78	(s)
France	0	101	639	0	0	0	0	0	0	0	123	863	863	2
Germany, FD (W)	0	1	611	0	0	0	0	0	0	4	34	650	650	2
Ghana	0	0	18	0	0	0	0	0	0	0	0	18	18	(s)
Greece	0	0	239	0	0	0	0	0	0	0	0	239	239	1
Guatemala	1,083	0	0	0	0	0	0	0	0	0	0	0	1,083	3
India	100	0	6,783	0	0	0	0	0	0	0	3,277	10,060	10,160	28
Ireland	0	0	174	0	0	0	0	0	0	0	0	174	174	(s)
Israel	0	0	0	0	0	0	0	0	0	36	0	36	36	(s)
Italy	351	0	3,269	0	0	0	0	0	0	4	706	3,979	4,330	12
Japan	0	0	0	0	0	0	0	0	0	72	194	266	266	1
Malaysia	2,259	0	0	0	0	0	0	0	0	0	0	0	2,259	6
Mexico	196,642	9,051	0	440	312	1,403	0	0	2,562	0	269	14,037	210,679	576
Netherlands Antilles	0	12	388	310	248	0	0	0	0	0	59	1,017	1,017	3
Netherlands	0	0	158	0	0	0	0	0	0	15	374	547	547	1
Norway	7,110	0	275	0	0	0	0	0	0	0	0	275	7,385	20
Oman	1,600	0	1,248	0	0	0	0	0	0	0	0	1,248	2,848	8
Panama	0	1	0	0	0	0	0	0	0	0	0	1	1	(s)
Portugal	0	0	0	22	0	0	0	0	0	0	93	115	115	(s)
Puerto Rico	0	0	0	0	0	0	0	0	0	0	853	853	853	2
Romania	0	0	0	172	0	0	0	0	313	0	0	485	485	1
South Africa	0	0	0	0	0	0	0	0	0	0	5	5	5	(s)
Spain	0	69	2,242	0	1	86	0	311	1	0	0	2,710	2,710	7
Sweden	0	0	0	0	0	0	0	0	0	0	307	307	307	1
Trinidad and Tobago	20,464	0	0	0	0	0	0	0	0	0	0	0	20,464	56
Tunisia	0	0	220	0	0	0	0	0	0	0	0	220	220	1
Turkey	0	84	1,878	0	0	0	0	0	0	0	539	2,501	2,501	7
United Kingdom	44,575	161	1,461	0	0	0	0	0	615	0	275	2,512	47,087	129
U.S.S.R.	0	0	2,826	0	0	0	0	0	1,455	0	0	4,281	4,281	12
Virgin Islands	0	0	416	0	0	229	2,150	0	0	0	0	2,795	2,795	8
Yemen (Sanaa)	3,837	0	0	0	0	0	0	0	0	0	0	0	3,837	10
Zaire	4,677	0	0	0	0	0	0	0	0	0	0	0	4,677	13
Subtotal Other	**392,280**	**10,107**	**27,609**	**1,267**	**1,308**	**1,718**	**2,150**	**911**	**5,874**	**1,078**	**8,078**	**60,100**	**452,380**	**1,236**
Total Imports	994,989	22,088	62,730	2,686	3,218	1,718	2,150	913	8,554	1,112	51,035	176,204	1,171,193	3,200
							PAD District IV							
Other														
Canada	23,456	4,494	0	0	573	0	0	1,352	7	1	377	6,804	30,260	83
China, People's Republic	0	1	0	0	0	0	0	0	0	0	0	1	1	(s)
Malta	0	(s)	0	0	0	0	0	0	0	0	0	(s)	(s)	(s)
Subtotal Other	**23,456**	**4,495**	**0**	**0**	**573**	**0**	**0**	**1,352**	**7**	**1**	**377**	**6,805**	**30,261**	**83**
Total Imports	23,456	4,495	0	0	573	0	0	1,352	7	1	377	6,805	30,261	83

See footnotes at end of table.

Table 15. Imports of Crude Oil and Petroleum Products by Source and PAD District,[1] 1988 (continued)
(Thousand Barrels)

Source	Crude Oil [2]	LPG	Unfinished Oils	Gasoline Blending Components	Finished Motor Gasoline	Jet Fuel	Kerosene	Distil. Fuel Oil	Resid. Fuel Oil	Special Naphthas	Other Products [3]	Total Products	Total Petroleum	Total (Daily Average)
							PAD District V							
Arab OPEC														
Kuwait	0	0	0	0	0	46	0	0	0	0	0	46	46	(s)
Saudi Arabia	0	0	0	0	1,843	878	0	0	0	0	0	2,721	2,721	7
United Arab Emirates	687	0	0	0	0	0	0	0	0	0	0	0	687	2
Subtotal Arab OPEC	687	0	0	0	1,843	924	0	0	0	0	0	2,767	3,454	9
Other OPEC														
Ecuador	291	0	0	0	0	0	0	0	181	0	0	181	472	1
Indonesia	44,317	0	254	0	0	0	0	0	3,511	0	524	4,289	48,606	133
Venezuela	0	0	0	0	495	725	0	0	0	0	211	1,431	1,431	4
Subtotal Other OPEC	44,608	0	254	0	495	725	0	0	3,692	0	735	5,901	50,509	138
Other														
Albania	0	0	0	0	120	0	0	0	0	0	0	120	120	(s)
Argentina	0	0	0	0	170	0	0	0	0	0	0	170	170	(s)
Australia	11,153	318	0	0	0	0	0	0	964	0	0	1,282	12,435	34
Bahama Islands	0	0	0	0	250	0	0	0	0	0	0	250	250	1
Brazil	0	0	0	0	1,022	0	0	0	0	0	0	1,022	1,022	3
Brunei	469	0	0	0	0	0	0	0	0	0	0	0	469	1
Canada	5,470	3,160	620	0	2,319	388	172	1,029	489	155	417	6,750	14,220	39
China, People's Republic	2,591	0	0	307	1,319	0	0	158	0	0	0	1,784	4,375	12
China, Taiwan	0	17	0	0	0	0	0	0	0	0	116	133	133	(s)
France	0	0	0	0	669	0	0	0	0	0	0	669	669	2
Hong Kong	0	(s)	0	0	0	0	0	0	0	0	0	(s)	(s)	(s)
Italy	0	0	252	0	0	418	0	0	0	0	0	670	670	2
Japan	0	19	0	0	0	0	0	57	0	0	238	314	314	1
Korea, Republic	0	6	0	0	76	258	0	0	0	0	262	602	602	2
Malaysia	4,609	0	0	0	0	0	0	0	126	0	0	126	4,735	13
Mexico	0	0	0	0	490	625	0	100	634	0	283	2,332	2,332	6
Netherlands Antilles	0	0	0	0	377	0	0	0	0	0	0	377	377	1
Netherlands	0	10	0	0	1,052	0	0	0	0	0	0	1,062	1,062	3
Philippines	0	74	0	0	0	0	0	0	0	0	0	74	74	(s)
Portugal	0	0	0	0	224	0	0	0	0	0	0	224	224	1
Singapore	0	0	901	13	146	1,391	0	79	6,947	0	10	9,487	9,487	26
South Africa	0	0	0	0	0	0	0	0	0	0	4	4	4	(s)
Spain	0	0	0	0	0	199	0	0	0	0	0	199	199	1
Switzerland	0	(s)	413	0	0	0	0	0	0	0	0	413	413	1
Thailand	4,055	0	0	0	0	0	0	0	0	0	0	0	4,055	11
United Kingdom	0	218	0	0	0	0	0	0	0	0	0	218	218	1
Virgin Islands	0	0	432	0	0	0	0	0	0	0	0	432	432	1
Subtotal Other	**26,347**	**3,823**	**2,618**	**320**	**8,254**	**3,279**	**172**	**1,423**	**9,360**	**155**	**1,330**	**30,734**	**59,081**	**161**
Total Imports	73,642	3,823	2,872	320	10,592	4,928	172	1,423	13,052	155	2,065	39,402	113,044	309

1 Crude oil and unfinished oils are reported by the PAD District in which they are to be processed; all other products are reported by the PAD District of entry.

2 Includes crude oil imported for storage in the Strategic Petroleum Reserve.

3 Includes aviation gasoline, aviation gasoline blending components, waxes, asphalt, lubricants, pentanes plus, naphthas less than 400 degrees F endpoint, other oils equal to or greater than 400 degrees F endpoint, petroleum coke and miscellaneous products.

4 Beginning in January 1988, imports of crude oil and petroleum products from the Neutral Zone are shown separately. Prior to January 1988, these data were included with imports from Saudi Arabia and Kuwait.

5 A small amount of Iranian crude oil entered the United States (defined in this publication as the 50 States and the District of Columbia) in January 1988 from the Virgin Islands. This oil originated in Iran and was exported to the Virgin Islands prior to the signing of Executive Order 12613 on Oct. 29, 1987.

(s) = Less than 500 barrels.

Note: Total may not equal sum of components due to independent rounding.
Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 16. Exports of Crude Oil and Petroleum Products by PAD District, 1988
(Thousand Barrels)

Commodity	Petroleum Administration for Defense Districts						Daily Average
	I	II	III	IV	V	Total	
Crude Oil (including lease condensate) [1]	(s)	3,727	0	0	52,986	56,713	155
Natural Gas Liquids	850	6,445	8,140	433	2,762	18,631	51
Pentanes Plus	0	784	0	0	0	784	2
Liquefied Petroleum Gases	850	5,661	8,140	433	2,762	17,847	49
Ethane	7	1,571	2	0	1	1,581	4
Propane	372	1,719	7,810	173	1,233	11,307	31
Normal Butane	471	1,586	329	260	1,529	4,176	11
Isobutane	0	784	0	0	0	784	2
Finished Motor Gasoline	240	668	5,310	1	1,852	8,071	22
Naphtha-Type Jet Fuel	9	(s)	248	2	235	494	1
Kerosene-Type Jet Fuel	274	7	5,925	(s)	3,498	9,703	27
Kerosene	92	245	44	1	54	435	1
Distillate Fuel Oil	349	452	12,201	1	12,097	25,100	69
Residual Fuel Oil	167	0	20,758	0	52,183	73,108	200
Naphtha < 400 Deg. for Petro. Feed. Use	687	299	960	11	429	2,386	7
Other Oils > 400 Deg. for Petro. Feed. Use	17	373	3,768	0	1,860	6,018	16
Special Naphthas	577	178	1,155	2	700	2,611	7
Lubricants	2,769	514	4,291	42	1,967	9,582	26
Waxes	76	140	311	(s)	97	625	2
Petroleum Coke	2,013	2,375	47,899	3	32,265	84,556	231
Asphalt	9	241	17	8	59	335	1
Miscellaneous Products	88	1	3	0	6	98	(s)
Total Product Exports	6,219	11,939	111,029	503	110,063	241,753	661
Total Exports	**6,219**	**15,686**	**111,029**	**503**	**163,049**	**298,466**	**815**

1. Crude oil exports are restricted to: 1) crude oil derived from fields under the State waters of Alaska's Cook Inlet; 2) certain domestically produced crude oil destined for Canada; and 3) shipments to U.S. territories.

(s) = Less than 500 barrels.

Note: Total may not equal sum of components due to independent rounding.

Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 17. Exports of Crude Oil and Petroleum Products by Destination, 1988
(Thousand Barrels)

Destination	Crude Oil [1]	LPG	Finished Motor Gasoline	Jet Fuel	Dist. Fuel Oil	Residual Fuel Oil	Special Naphthas	Lubricants	Waxes	Petroleum Coke	Asphalt	Other[2]	Total	Total (Daily Average)
Argentina	0	41	0	0	220	256	9	66	1	6	(s)	117	716	2
Australia	0	19	0	0	255	2,454	57	139	6	2,845	1	30	5,806	16
Bahamas	0	112	650	339	2,193	4,795	(s)	44	(s)	0	(s)	1	8,135	22
Bahrain	0	1	0	0	(s)	0	(s)	1	(s)	444	0	3	449	1
Belgium & Luxembourg	0	113	(s)	0	0	0	104	261	10	8,706	1	15	9,211	25
Brazil	0	54	45	0	263	33	32	160	(s)	484	(s)	7	1,079	3
Cameroon	0	0	0	0	0	0	0	(s)	0	226	0	0	226	1
Canada	3,737	6,738	1,393	2,433	3,562	3,625	250	1,521	170	5,039	290	1,874	30,634	84
Chile	0	3	50	0	373	222	11	217	3	(s)	(s)	5	884	2
China, Taiwan	951	73	1	0	787	15,261	5	543	31	260	1	278	18,190	50
Colombia	0	1	151	0	0	0	13	88	(s)	3	(s)	10	265	1
Costa Rica	0	1	21	0	(s)	0	30	124	1	20	(s)	46	244	1
Denmark	0	1	0	0	1	0	1	6	(s)	771	1	8	790	2
Dominican Republic	0	65	4	0	139	58	6	38	1	(s)	0	6	319	1
Ecuador	0	1	62	10	(s)	0	3	152	1	0	(s)	10	239	1
Egypt	0	(s)	0	0	0	0	0	12	(s)	268	(s)	3	283	1
El Salvador	0	17	97	0	78	0	3	37	(s)	(s)	0	35	268	1
Finland	0	(s)	0	0	0	0	0	13	(s)	174	(s)	3	190	1
France	0	135	(s)	0	(s)	107	2	38	80	2,821	(s)	1,129	4,312	12
French Pacific Isl	0	2	0	0	392	1,390	(s)	4	0	0	0	0	1,787	5
Ghana	0	0	0	0	0	0	(s)	3	0	367	(s)	(s)	371	1
Greece	0	10	0	0	0	0	2	9	(s)	1,664	0	(s)	1,684	5
Guatemala	0	918	931	92	1,444	169	13	119	1	(s)	(s)	18	3,706	10
Guinea	0	0	0	0	0	0	0	8	0	0	(s)	(s)	8	(s)
Honduras	0	60	25	20	70	45	6	51	3	0	0	11	290	1
Hong Kong	0	6	0	0	0	0	2	35	2	(s)	(s)	4	49	(s)
India	0	1	0	0	0	0	20	156	2	(s)	(s)	27	207	1
Indonesia	0	1	0	0	0	0	4	33	(s)	194	(s)	1	234	1
Iran	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Israel	0	3	39	448	0	0	11	32	(s)	282	0	13	828	2
Italy	0	152	3	0	0	0	26	49	9	9,552	1	877	10,668	29
Ivory Coast	0	0	0	0	0	0	0	25	(s)	0	(s)	(s)	25	(s)
Jamaica	0	196	270	0	760	2,795	2	57	2	(s)	0	7	4,089	11
Japan	0	60	2,669	5,792	7,351	5,854	957	612	38	21,235	(s)	867	45,435	124
Jordan	0	1	0	0	0	0	0	11	0	0	0	2	14	(s)
Korea, Republic	0	282	3	0	714	4,724	67	614	4	1,199	(s)	1,001	8,608	24
Kuwait	0	1	0	(s)	0	0	(s)	15	0	0	0	2	18	(s)
Lebanon	0	(s)	0	0	0	0	0	8	(s)	348	0	(s)	357	1
Liberia	0	(s)	0	0	0	21	0	1	0	0	(s)	(s)	22	(s)
Malaysia	0	(s)	0	0	0	0	3	19	4	11	(s)	52	90	(s)
Mexico	0	7,584	778	18	2	15,011	65	1,115	163	896	3	130	25,764	70
Netherlands	0	71	19	0	82	19	457	142	7	8,131	1	762	9,692	26
Netherlands Antilles	0	(s)	9	2	79	5,327	1	21	0	0	0	3	5,442	15
New Zealand	0	1	0	0	(s)	0	9	25	1	522	2	12	572	2
Nigeria	0	0	0	0	0	0	0	98	1	0	(s)	0	99	(s)
Norway	0	8	0	0	(s)	0	(s)	6	(s)	1,175	(s)	1	1,190	3
Pacific Trust Terr.	0	4	0	0	0	0	0	4	0	0	0	(s)	8	(s)
Panama	0	32	409	2	1,075	1,612	9	263	(s)	0	1	23	3,426	9
Peru	0	29	45	900	3,007	0	1	136	(s)	1	(s)	3	4,122	11
Philippines	0	30	0	0	1	0	9	62	3	27	(s)	121	253	1
Puerto Rico	6,223	116	138	119	310	97	226	417	15	11	1	151	7,824	21
Rep. of South Africa	0	93	0	0	(s)	0	(s)	9	1	362	(s)	41	507	1
Saudi Arabia	0	125	0	0	(s)	0	3	89	(s)	4	(s)	24	245	1

See footnotes at end of table.

Table 17. Exports of Crude Oil and Petroleum Products by Destination, 1988 (continued)
(Thousand Barrels)

Destination	Crude Oil [1]	LPG	Finished Motor Gasoline	Jet Fuel	Dist. Fuel Oil	Residual Fuel Oil	Special Naphthas	Lubricants	Waxes	Petroleum Coke	Asphalt	Other[2]	Total	Total (Daily Average)
Singapore	0	8	0	0	326	4,513	18	85	(s)	58	(s)	184	5,193	14
Spain	0	(s)	0	0	529	3,425	1	47	19	8,460	(s)	711	13,194	36
Surinam	0	83	0	0	0	0	(s)	10	0	22	0	(s)	116	(s)
Sweden	0	(s)	0	0	0	0	2	20	1	307	1	4	335	1
Switzerland	0	3	0	0	1	0	1	15	(s)	0	1	3	23	(s)
Thailand	0	3	0	0	0	0	7	43	1	(s)	(s)	296	352	1
Trinidad and Tobago	0	7	0	0	80	0	108	3	(s)	1	0	4	202	1
Turkey	0	1	0	0	0	0	0	46	(s)	1,394	0	2	1,442	4
United Arab Emirates	0	5	0	0	0	5	(s)	86	0	247	(s)	16	359	1
United Kingdom	0	167	75	0	6	204	2	66	6	2,304	8	530	3,370	9
U.S.S.R.	0	0	0	0	0	25	0	911	0	433	1	12	1,380	4
Uruguay	0	(s)	16	0	0	182	0	12	(s)	0	0	(s)	211	1
Venezuela	0	16	0	5	257	0	21	75	3	993	(s)	12	1,383	4
Virgin Islands	45,801	5	7	(s)	0	125	(s)	21	0	0	0	13	45,972	126
West Germany	0	147	2	0	1	0	17	209	31	956	12	60	1,435	4
Yugoslavia	0	0	0	0	0	0	(s)	2	0	321	1	1	324	1
Other	0	240	160	16	741	756	10	222	3	1,009	5	140	3,302	9
Total	**56,713**	**17,847**	**8,071**	**10,197**	**25,100**	**73,108**	**2,611**	**9,582**	**625**	**84,556**	**335**	**9,721**	**298,466**	**815**

[1] Crude oil exports are restricted to: 1) crude oil derived from fields under the State waters of Alaska's Cook Inlet; 2) certain domestically produced crude oil destined for Canada; and 3) shipments to U.S. territories.

[2] Includes pentanes plus, kerosene, naphtha less than 400 degrees F endpoint, other oils equal to or greater than 400 degrees F endpoint and miscellaneous products.

(s) = Less than 500 barrels.

Note: Total may not equal sum of components due to independent rounding.

Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 18. Stocks of Crude Oil and Petroleum Products by PAD District, December 31, 1988
(Thousand Barrels)

Commodity	PAD District I			PAD District II				PAD District III						PAD Dist. IV	PAD Dist. V	United States
	East Coast	Appala-chian No.1	Total	Ind., Ill., Ky	Minn., Wisc., Daks	Okla., Kans., Mo.	Total	Texas Inland	Texas Gulf Coast	La. Gulf Coast	N. La., Ark.	New Mexico	Total	Rocky Mt.	West Coast	
Crude Oil (incl. lease condensate)																
Refinery	--	--	14,179	--	--	--	12,029	--	--	--	--	--	42,733	1,721	21,467	92,129
Tank Farms and Pipelines	--	--	1,331	--	--	--	57,936	--	--	--	--	--	92,557	8,839	33,115	193,778
Leases	--	--	49	--	--	--	1,611	--	--	--	--	--	16,606	1,231	1,720	21,217
Strategic Petroleum Reserve[1]	--	--	0	--	--	--	0	--	--	--	--	--	559,515	0	0	559,515
Alaskan In-Transit	--	--	0	--	--	--	0	--	--	--	--	--	0	0	23,235	23,235
Total	--	--	15,559	--	--	--	71,576	--	--	--	--	--	711,411	11,791	79,537	889,874
Total Stocks, All Oils (excl. Crude Oil)																
Refinery	41,259	3,192	44,451	35,567	6,481	15,425	57,473	10,309	72,263	48,238	5,199	1,183	137,192	12,106	64,171	315,393
Bulk Terminal	--	--	39,552	--	--	--	71,083	--	--	--	--	--	68,172	3,133	26,355	268,295
Pipeline	--	--	28,088	--	--	--	34,685	--	--	--	--	--	42,301	2,463	5,437	112,974
Natural Gas Processing Plant	132	37	169	208	49	2,194	2,451	1,208	5,702	627	147	121	7,805	166	105	10,696
Total	--	--	172,260	--	--	--	165,692	--	--	--	--	--	255,470	17,868	96,068	707,358
Pentanes Plus																
Refinery	19	0	19	52	43	172	267	323	109	124	12	29	597	2	10	895
Bulk Terminal	--	--	22	--	--	--	1,248	--	--	--	--	--	1,394	0	6	2,670
Pipeline	--	--	0	--	--	--	404	--	--	--	--	--	855	77	0	1,336
Natural Gas Processing Plant	5	3	8	19	13	424	456	435	471	253	28	19	1,206	64	14	1,748
Total	--	--	49	--	--	--	2,375	--	--	--	--	--	4,052	143	30	6,649
Liquefied Petroleum Gases																
Refinery	1,223	13	1,236	2,078	188	481	2,747	1,728	2,722	3,109	27	29	7,615	308	816	12,722
Bulk Terminal	--	--	1,902	--	--	--	17,846	--	--	--	--	--	38,804	124	1,858	60,534
Pipeline	--	--	1,484	--	--	--	7,022	--	--	--	--	--	6,223	441	0	15,170
Natural Gas Processing Plant	127	34	161	189	36	1,770	1,995	742	5,231	371	118	102	6,564	102	91	8,913
Total	--	--	4,783	--	--	--	29,610	--	--	--	--	--	59,206	975	2,765	97,339
Ethane																
Refinery	20	0	20	1	0	0	1	62	470	0	0	0	552	0	0	553
Bulk Terminal	--	--	2	--	--	--	2,329	--	--	--	--	--	9,158	0	0	11,489
Pipeline	--	--	0	--	--	--	1,383	--	--	--	--	--	2,516	144	0	4,043
Natural Gas Processing Plant	0	0	0	17	0	462	479	70	1,188	3	21	24	1,306	2	0	1,787
Total	--	--	22	--	--	--	4,192	--	--	--	--	--	13,512	146	0	17,872

See footnotes at end of table.

Table 18. Stocks of Crude Oil and Petroleum Products by PAD District, December 31, 1988 (continued)
(Thousand Barrels)

Commodity	PAD District I			PAD District II				PAD District III						PAD Dist. IV	PAD Dist. V	United States
	East Coast	Appalachian No.1	Total	Ind., Ill., Ky.	Minn., Wisc., Daks.	Okla., Kans., Mo.	Total	Texas Inland	Texas Gulf Coast	La. Gulf Coast	N. La., Ark.	New Mexico	Total	Rocky Mt.	West Coast	
Propane																
Refinery	912	1	913	1,218	30	130	1,378	911	1,014	1,746	7	4	3,682	91	145	6,209
Bulk Terminal	--	--	1,472	--	--	--	11,267	--	--	--	--	--	19,628	123	476	32,966
Pipeline	--	--	1,364	--	--	--	3,748	--	--	--	--	--	2,653	174	0	7,939
Natural Gas Processing Plant	76	22	98	110	28	877	1,015	375	1,373	221	47	47	2,063	62	75	3,313
Total	--	--	3,847	--	--	--	17,408	--	--	--	--	--	28,026	450	696	50,427
Normal Butane																
Refinery	228	12	240	668	75	249	992	481	516	1,189	5	18	2,209	143	527	4,111
Bulk Terminal	--	--	426	--	--	--	3,066	--	--	--	--	--	7,383	1	1,165	12,041
Pipeline	--	--	120	--	--	--	1,344	--	--	--	--	--	721	80	0	2,265
Natural Gas Processing Plant	49	5	54	43	8	287	338	247	1,763	86	38	24	2,158	32	10	2,592
Total	--	--	840	--	--	--	5,740	--	--	--	--	--	12,471	256	1,702	21,009
Isobutane																
Refinery	63	0	63	191	83	102	376	274	722	174	15	7	1,192	74	144	1,849
Bulk Terminal	--	--	2	--	--	--	1,184	--	--	--	--	--	2,635	0	217	4,038
Pipeline	--	--	0	--	--	--	547	--	--	--	--	--	333	43	0	923
Natural Gas Processing Plant	2	7	9	19	0	144	163	50	907	61	12	7	1,037	6	6	1,221
Total	--	--	74	--	--	--	2,270	--	--	--	--	--	5,197	123	367	8,031
Other Hydrocarbons and Alcohol																
Refinery	0	0	0	61	2	30	93	0	197	96	0	6	299	40	16	448
Total	--	--	0	--	--	--	93	--	--	--	--	--	299	40	16	448
Unfinished Oils																
Refinery																
Naphthas and Lighter	3,742	210	3,952	2,248	102	1,125	3,475	687	8,425	4,231	205	30	13,578	400	4,155	25,560
Kerosene and Light Gas Oils	2,793	146	2,939	1,632	106	156	1,894	350	6,283	2,646	96	3	9,378	277	3,189	17,677
Heavy Gas Oils	4,021	279	4,300	4,241	206	1,404	5,851	588	8,113	6,336	446	133	15,616	748	12,168	38,683
Residuum	1,032	147	1,179	2,341	114	1,479	3,934	465	4,962	3,483	67	0	8,977	381	3,467	17,938
Total	11,588	782	12,370	10,462	528	4,164	15,154	2,090	27,783	16,696	814	166	47,549	1,806	22,979	99,858

See footnotes at end of table.

Table 18. Stocks of Crude Oil and Petroleum Products by PAD District, December 31, 1988 (continued)

(Thousand Barrels)

Commodity	PAD District I			PAD District II				PAD District III						PAD Dist. IV	PAD Dist. V	United States
	East Coast	Appalachian No.1	Total	Ind., Ill., Ky	Minn., Wisc., Daks.	Okla., Kans., Mo.	Total	Texas Inland	Texas Gulf Coast	La. Gulf Coast	N. La., Ark.	New Mexico	Total	Rocky Mt.	West Coast	
Motor Gasoline Blending Components																
Refinery	4,514	149	4,663	4,583	672	1,728	6,983	1,382	6,472	5,543	132	257	13,786	2,292	8,774	36,498
Bulk Terminal	--	--	171	--	--	--	228	--	--	--	--	--	1,210	49	23	1,681
Pipeline	--	--	86	--	--	--	62	--	--	--	--	--	81	0	143	372
Total	--	--	4,920	--	--	--	7,273	--	--	--	--	--	15,077	2,341	8,940	38,551
Aviation Gasoline Blending Components																
Refinery	0	0	0	72	0	81	153	0	17	68	0	0	85	0	12	250
Total	--	--	0	--	--	--	153	--	--	--	--	--	85	0	12	250
Total Finished Motor Gasoline																
Refinery	7,916	447	8,363	5,859	931	2,992	9,782	1,958	10,034	5,816	958	161	18,927	2,218	10,132	49,422
Bulk Terminal	--	--	35,137	--	--	--	26,825	--	--	--	--	--	10,779	1,872	11,963	86,576
Pipeline	--	--	14,042	--	--	--	15,937	--	--	--	--	--	20,276	1,105	2,494	53,854
Total	--	--	57,542	--	--	--	52,544	--	--	--	--	--	49,982	5,195	24,589	189,852
Finished Leaded Motor Gasoline																
Refinery	852	136	988	1,291	321	1,280	2,892	542	1,588	1,345	107	77	3,659	956	2,819	11,314
Bulk Terminal	--	--	5,170	--	--	--	7,108	--	--	--	--	--	2,742	764	4,065	19,849
Pipeline	--	--	1,794	--	--	--	3,212	--	--	--	--	--	3,203	385	402	8,996
Total	--	--	7,952	--	--	--	13,212	--	--	--	--	--	9,604	2,105	7,286	40,159
Finished Unleaded Motor Gasoline																
Refinery	7,064	311	7,375	4,568	610	1,712	6,890	1,416	8,446	4,471	851	84	15,268	1,262	7,313	38,108
Bulk Terminal	--	--	29,967	--	--	--	19,717	--	--	--	--	--	8,037	1,108	7,898	66,727
Pipeline	--	--	12,248	--	--	--	12,725	--	--	--	--	--	17,073	720	2,092	44,858
Total	--	--	49,590	--	--	--	39,332	--	--	--	--	--	40,378	3,090	17,303	149,693
Finished Aviation Gasoline																
Refinery	74	0	74	77	3	10	90	76	326	217	0	0	619	35	286	1,104
Bulk Terminal	--	--	304	--	--	--	304	--	--	--	--	--	47	12	234	901
Pipeline	--	--	0	--	--	--	83	--	--	--	--	--	30	0	0	113
Total	--	--	378	--	--	--	477	--	--	--	--	--	696	47	520	2,118

See footnotes at end of table.

Table 18. Stocks of Crude Oil and Petroleum Products by PAD District, December 31, 1988 (continued)
(Thousand Barrels)

Commodity	PAD District I			PAD District II				PAD District III						PAD Dist. IV	PAD Dist. V	United States
	East Coast	Appalachian No.1	Total	Ind., Ill., Ky.	Minn., Wisc., Daks.	Okla., Kans., Mo.	Total	Texas Inland	Texas Gulf Coast	La. Gulf Coast	N. La., Ark.	New Mexico	Total	Rocky Mt.	West Coast	
Naphtha-Type Jet Fuel																
Refinery	445	0	445	290	29	180	499	283	321	466	115	129	1,314	301	806	3,365
Bulk Terminal	--	--	412	--	--	--	214	--	--	--	--	--	166	9	626	1,427
Pipeline	--	--	122	--	--	--	172	--	--	--	--	--	453	109	403	1,259
Total	--	--	979	--	--	--	885	--	--	--	--	--	1,933	419	1,835	6,051
Kerosene-Type Jet Fuel																
Refinery	1,818	16	1,834	1,308	166	421	1,895	372	3,168	2,510	34	29	6,113	336	3,937	14,115
Bulk Terminal	--	--	4,214	--	--	--	2,746	--	--	--	--	--	2,580	142	2,238	11,920
Pipeline	--	--	3,386	--	--	--	2,928	--	--	--	--	--	4,451	171	752	11,688
Total	--	--	9,434	--	--	--	7,569	--	--	--	--	--	13,144	649	6,927	37,723
Kerosene																
Refinery	218	83	301	445	71	327	843	56	507	333	67	0	963	26	173	2,306
Bulk Terminal	--	--	2,403	--	--	--	887	--	--	--	--	--	235	16	32	3,573
Pipeline	--	--	469	--	--	--	202	--	--	--	--	--	729	0	5	1,405
Total	--	--	3,173	--	--	--	1,932	--	--	--	--	--	1,927	42	210	7,284
Distillate Fuel Oils																
Refinery	7,247	437	7,684	4,797	1,092	2,602	8,491	831	7,428	4,881	957	121	14,218	1,424	5,433	37,250
Bulk Terminal	--	--	33,040	--	--	--	14,978	--	--	--	--	--	5,081	847	5,251	59,197
Pipeline	--	--	8,499	--	--	--	7,836	--	--	--	--	--	8,867	560	1,306	27,068
Natural Gas Processing Plant	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	2
Total	--	--	49,223	--	--	--	31,305	--	--	--	--	--	28,168	2,831	11,990	123,517
Residual Fuel Oils																
Refinery	2,451	69	2,520	1,853	365	150	2,368	176	3,679	2,658	87	4	6,604	663	5,518	17,673
Bulk Terminal	--	--	16,283	--	--	--	1,174	--	--	--	--	--	5,760	0	3,452	26,669
Pipeline	--	--	0	--	--	--	0	--	--	--	--	--	74	0	205	279
Total	--	--	18,803	--	--	--	3,542	--	--	--	--	--	12,438	663	9,175	44,621
Naphtha < 400 Deg. Petro. Feed. Use																
Refinery	372	0	372	176	0	97	273	65	793	216	59	7	1,140	7	169	1,961
Total	372	0	372	176	0	97	273	65	793	216	59	7	1,140	7	169	1,961
Other Oils > 400 Deg. Petro. Feed. Use																
Refinery	4	0	4	0	0	0	0	84	1,252	257	0	0	1,593	3	143	1,743
Total	4	0	4	0	0	0	0	84	1,252	257	0	0	1,593	3	143	1,743

See footnotes at end of table.

Table 18. Stocks of Crude Oil and Petroleum Products by PAD District, December 31, 1988 (continued)
(Thousand Barrels)

Commodity	PAD District I			PAD District II				PAD District III						PAD Dist. IV	PAD Dist. V	United States
	East Coast	Appalachian No.1	Total	Ind., Ill., Ky.	Minn., Wisc., Daks.	Okla., Kans., Mo.	Total	Texas Inland	Texas Gulf Coast	La. Gulf Coast	N. La., Ark.	New Mexico	Total	Rocky Mt.	West Coast	
Special Naphthas																
Refinery	515	53	568	170	0	109	279	83	1,172	38	169	0	1,462	7	154	2,470
Bulk Terminal	--	--	584	--	--	--	374	--	--	--	--	--	47	0	12	1,017
Total	--	--	1,152	--	--	--	653	--	--	--	--	--	1,509	7	166	3,487
Lubricants																
Refinery	296	799	1,095	927	0	424	1,351	27	4,105	1,318	600	0	6,050	69	910	9,475
Bulk Terminal	--	--	1,814	--	--	--	857	--	--	--	--	--	709	0	461	3,841
Total	--	--	2,909	--	--	--	2,208	--	--	--	--	--	6,759	69	1,371	13,316
Waxes																
Refinery	0	79	79	94	0	21	115	80	218	145	14	0	457	78	95	824
Total	--	--	79	--	--	--	115	--	--	--	--	--	457	78	95	824
Petroleum Coke																
Refinery	856	0	856	284	1,028	174	1,486	15	668	2,725	257	0	3,665	15	1,768	7,790
Total	856	0	856	284	1,028	174	1,486	15	668	2,725	257	0	3,665	15	1,768	7,790
Asphalt and Road Oil																
Refinery	1,593	225	1,818	1,775	1,345	1,240	4,360	631	928	771	897	245	3,472	2,418	1,876	13,944
Bulk Terminal	--	--	2,702	--	--	--	3,259	--	--	--	--	--	680	61	171	6,873
Total	--	--	4,520	--	--	--	7,619	--	--	--	--	--	4,152	2,479	2,047	20,817
Miscellaneous Products																
Refinery	110	40	150	204	18	22	244	49	364	251	0	0	664	58	164	1,280
Bulk Terminal	--	--	564	--	--	--	143	--	--	--	--	--	680	1	28	1,416
Pipeline	--	--	0	--	--	--	39	--	--	--	--	--	262	0	129	430
Natural Gas Processing Plant	0	0	0	0	0	0	0	31	0	1	1	0	33	0	0	33
Total	--	--	714	--	--	--	426	--	--	--	--	--	1,639	59	321	3,159
Total Stocks, All Oils	--	--	187,819	--	--	--	237,268	--	--	--	--	--	966,881	29,659	175,605	1,597,232

[1] Includes 38,395 thousand barrels of domestic crude oil.
Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 19. Refinery and Bulk Terminal Stocks of Selected Petroleum Products by State, December 31, 1988
(Thousand Barrels)

State	Leaded Motor Gasoline	Unleaded Motor Gasoline	Kerosene	Distillate Fuel Oil	Residual Fuel Oil
PAD District I Total	**101,468**	**433,761**	**30,236**	**458,772**	**214,605**
Connecticut	4,453	13,576	2,841	31,835	4,145
Delaware, D.C., Maryland	3,230	22,787	2,232	33,448	18,677
Florida	12,838	63,108	2,066	24,228	13,549
Georgia	10,767	24,236	1,151	13,452	3,245
Maine, New Hampshire, Vermont	2,828	11,000	2,218	22,628	7,992
Massachusetts	2,624	22,069	990	29,414	15,964
New Jersey	14,646	102,334	1,333	118,326	82,485
New York	11,060	41,830	3,463	61,522	33,848
North Carolina	10,417	22,786	3,970	18,319	4,427
Pennsylvania	12,949	54,430	5,696	55,079	16,578
Rhode Island	1,933	6,949	w	11,614	w
South Carolina	5,655	14,996	1,931	9,791	w
Virginia	6,657	31,099	2,020	27,622	7,892
West Virginia	1,411	2,561	w	1,494	w
PAD District II Total	**124,389**	**313,809**	**20,401**	**261,155**	**40,354**
Illinois	23,499	61,412	3,780	47,648	15,708
Indiana	14,649	42,106	1,675	31,294	6,573
Iowa	6,444	12,498	w	13,122	w
Kansas, Nebraska	13,217	23,400	334	26,194	694
Kentucky	6,468	12,774	1,030	9,501	w
Michigan	11,112	36,130	1,830	23,138	1,981
Minnesota	6,761	15,590	w	21,780	2,152
Missouri	5,160	11,107	w	8,585	w
North Dakota, South Dakota	2,870	5,640	w	8,626	w
Ohio	10,101	40,538	6,336	24,751	3,467
Oklahoma	9,829	16,350	w	20,286	2,715
Tennessee	7,333	19,065	909	10,786	2,514
Wisconsin	6,946	17,199	w	15,444	1,216
PAD District III Total	**85,722**	**267,850**	**18,502**	**235,857**	**159,351**
Alabama	6,051	13,932	983	10,319	10,221
Arkansas	2,262	3,746	w	2,331	w
Louisiana	14,624	51,941	5,270	46,963	62,947
Mississippi	7,965	22,520	299	24,103	w
New Mexico	2,171	3,485	w	2,907	149
Texas	52,649	172,226	11,881	149,234	83,435
PAD District IV Total	**19,140**	**25,288**	**734**	**27,949**	**5,839**
Colorado	4,456	8,103	w	5,390	w
Idaho	1,694	2,322	w	2,200	w
Montana	6,130	5,967	w	7,808	1,054
Utah	2,568	3,360	w	4,706	1,465
Wyoming	4,292	5,536	w	7,845	w
PAD District V Total	**76,742**	**162,466**	**2,889**	**123,754**	**98,279**
Alaska	3,309	5,283	w	13,004	w
Arizona	3,447	5,951	w	2,886	w
California	42,412	107,384	1,636	70,094	60,458
Hawaii	1,126	6,226	w	5,694	w
Nevada	1,314	2,736	w	1,691	w
Oregon	8,142	9,664	w	9,877	3,311
Washington	16,992	25,222	w	20,508	15,979
U.S. Total	**407,461**	**1,203,174**	**72,762**	**1,107,487**	**518,428**

Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 20. Movements of Crude Oil and Petroleum Products by Pipeline, Tanker, and Barge Between PAD Districts, 1988
(Thousand Barrels)

Commodity	From I to			From II to				From III to				From IV to			From V to			
	II	III	V	I	III	IV	V	I	II	IV	V	II	III	V	I	II	III	IV
Crude Oil	**38**	**0**	**0**	**1,581**	**29,489**	**8,315**	**0**	**5,629**	**547,189**	**0**	**0**	**64,138**	**28,868**	**0**	**14,834**	**0**	**194,881**	**0**
Petroleum Products	**86,102**	**3,004**	**0**	**47,727**	**64,063**	**21,725**	**0**	**950,488**	**319,012**	**0**	**23,077**	**15,825**	**17,199**	**17,029**	**0**	**0**	**434**	**0**
Pentanes Plus	0	0	0	0	2,372	0	0	0	8,061	0	0	733	1,528	0	0	0	0	0
Liquefied Petroleum Gases	9	0	0	9,360	30,180	1,164	0	24,910	42,335	0	0	6,240	15,671	0	0	0	0	0
Unfinished Oils	4	0	0	0	348	0	0	2,122	1,194	0	850	0	0	0	0	0	0	0
Blending Components																		
Motor Gasoline	301	851	0	1,555	151	0	0	1,147	488	0	124	0	0	0	0	0	0	0
Aviation Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Finished Motor Gasoline	57,856	0	0	23,462	17,630	11,377	0	529,303	164,442	0	12,100	5,309	0	11,129	0	0	0	0
Finished Leaded Motor Gasoline	11,946	0	0	3,413	4,412	2,393	0	75,398	31,922	0	3,449	2,086	0	4,637	0	0	0	0
Finished Unleaded Motor Gasoline	45,910	0	0	20,049	13,218	8,984	0	453,905	132,520	0	8,651	3,223	0	6,492	0	0	0	0
Finished Aviation Gasoline	80	0	0	0	35	191	0	1,933	1,333	0	69	0	0	0	0	0	0	0
Naphtha-Type Jet Fuel	0	0	0	0	904	0	0	5,715	13	0	3,178	601	0	1,100	0	0	0	0
Kerosene-Type Jet Fuel	3,603	0	0	2,604	1,851	6,650	0	124,148	37,857	0	1,719	47	0	1,017	0	0	0	0
Kerosene	476	0	0	454	1,638	0	0	6,334	155	0	0	0	0	0	0	0	0	0
Distillate Fuel Oil	22,983	0	0	6,772	5,213	2,343	0	227,654	52,990	0	4,555	2,895	0	3,783	0	0	0	0
Residual Fuel Oil	23	0	0	252	3,112	0	0	6,930	531	0	0	0	0	0	0	0	0	0
Petrochemical Feedstocks[1]	694	133	0	573	95	0	0	185	761	0	0	0	0	0	0	0	0	0
Special Naphthas	1	33	0	0	13	0	0	3,248	1,606	0	0	0	0	0	0	0	0	0
Lubricants	62	921	0	1,095	416	0	0	11,562	4,399	0	482	0	0	0	0	0	403	0
Waxes	0	0	0	0	0	0	0	59	10	0	0	0	0	0	0	0	0	0
Asphalt and Road Oil	0	814	0	1,556	0	0	0	4,358	2,834	0	0	0	0	0	0	0	0	0
Miscellaneous Products	10	252	0	44	105	0	0	880	3	0	0	0	0	0	0	0	31	0
Total	**86,140**	**3,004**	**0**	**49,308**	**93,552**	**30,040**	**0**	**956,117**	**866,201**	**0**	**23,077**	**79,963**	**46,067**	**17,029**	**14,834**	**0**	**195,315**	**0**

[1] Includes naphtha less than 400 degrees F endpoint and other oils equal to or greater than 400 degrees F endpoint.
Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 21. Movements of Crude Oil and Petroleum Products by Pipeline Between PAD Districts, 1988
(Thousand Barrels)

Commodity	From I to		From II to			From III to				From IV to			From V to	
	II	III	I	III	IV	I	II	IV	V	II	III	V	III	IV
Crude Oil	**0**	**0**	**129**	**29,489**	**8,315**	**0**	**547,189**	**0**	**0**	**64,138**	**28,868**	**0**	**37,536**	**0**
Petroleum Products	**84,495**	**0**	**26,702**	**59,491**	**21,725**	**762,281**	**269,125**	**0**	**21,064**	**15,825**	**17,199**	**17,029**	**0**	**0**
Pentanes Plus	0	0	0	2,372	0	0	8,061	0	0	733	1,528	0	0	0
Liquefied Petroleum Gases	0	0	9,360	30,126	1,164	22,037	42,206	0	0	6,240	15,671	0	0	0
Blending Components														
Motor Gasoline	0	0	1,535	0	0	0	0	0	0	0	0	0	0	0
Aviation Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Finished Motor Gasoline	57,677	0	12,173	17,533	11,377	433,009	141,602	0	11,612	5,309	0	11,129	0	0
Finished Leaded Motor Gasoline	11,824	0	1,268	4,412	2,393	62,262	26,948	0	3,316	2,086	0	4,637	0	0
Finished Unleaded Motor Gasoline	45,853	0	10,905	13,121	8,984	370,747	114,654	0	8,296	3,223	0	6,492	0	0
Finished Aviation Gasoline	80	0	0	0	191	446	1,159	0	0	0	0	0	0	0
Naphtha-Type Jet Fuel	0	0	0	904	0	2,615	13	0	3,178	601	0	1,100	0	0
Kerosene-Type Jet Fuel	3,603	0	1,529	1,730	6,650	103,053	34,154	0	1,719	47	0	1,017	0	0
Kerosene	470	0	10	1,508	0	5,792	0	0	0	0	0	0	0	0
Distillate Fuel Oil	22,665	0	2,095	5,213	2,343	195,329	41,930	0	4,555	2,895	0	3,783	0	0
Residual Fuel Oil	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous Products	0	0	0	105	0	0	0	0	0	0	0	0	0	0
Total	**84,495**	**0**	**26,831**	**88,980**	**30,040**	**762,281**	**816,314**	**0**	**21,064**	**79,963**	**46,067**	**17,029**	**37,536**	**0**

Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 22. Movements of Crude Oil and Petroleum Products by Tanker and Barge Between PAD Districts, 1988
(Thousand Barrels)

Commodity	From I to			From II to			From III to						From V to		
	II	III	V	I	III	V	I	New England	Central Atlantic	Lower Atlantic	II	V	I	II	III
Crude Oil	**38**	**0**	**0**	**1,452**	**0**	**0**	**5,629**	**0**	**5,629**	**0**	**0**	**0**	**14,834**	**0**	**157,345**
Petroleum Products	**1,607**	**3,004**	**0**	**21,025**	**4,572**	**0**	**188,207**	**4,307**	**25,792**	**158,108**	**49,887**	**2,013**	**0**	**0**	**434**
Liquefied Petroleum Gases	9	0	0	0	54	0	2,873	0	0	2,873	129	0	0	0	0
Unfinished Oils	4	0	0	0	348	0	2,122	0	480	1,642	1,194	850	0	0	0
Motor Gasoline Blending Components	301	851	0	20	151	0	1,147	0	1,087	60	488	124	0	0	0
Finished Motor Gasoline	179	0	0	11,289	97	0	96,294	191	1,291	94,712	22,840	488	0	0	0
Finished Leaded Motor Gasoline	122	0	0	2,145	0	0	13,136	73	285	12,778	4,974	133	0	0	0
Finished Unleaded Motor Gasoline	57	0	0	9,144	97	0	83,158	118	1,106	81,934	17,866	355	0	0	0
Finished Aviation Gasoline	0	0	0	0	35	0	1,487	77	714	696	174	69	0	0	0
Naphtha-Type Jet Fuel	0	0	0	0	0	0	3,100	0	210	2,890	0	0	0	0	0
Kerosene-Type Jet Fuel	0	0	0	1,075	121	0	21,095	205	2,431	18,459	3,703	0	0	0	0
Kerosene	6	0	0	444	130	0	542	11	243	288	155	0	0	0	0
Distillate Fuel Oil	318	0	0	4,677	0	0	32,325	3,400	8,192	20,733	11,060	0	0	0	0
Residual Fuel Oil	23	0	0	252	3,112	0	6,930	423	3,560	2,947	531	0	0	0	0
Petrochemical Feedstocks[1]	694	133	0	573	95	0	185	0	114	71	761	0	0	0	0
Special Naphthas	1	33	0	0	13	0	3,248	0	1,285	1,963	1,606	0	0	0	0
Lubricants	62	921	0	1,095	416	0	11,562	0	5,289	6,273	4,399	482	0	0	403
Waxes	0	0	0	0	0	0	59	0	47	12	10	0	0	0	0
Asphalt and Road Oil	0	814	0	1,556	0	0	4,358	0	119	4,239	2,834	0	0	0	0
Miscellaneous Products	10	252	0	44	0	0	880	0	630	250	3	0	0	0	31
Total	**1,645**	**3,004**	**0**	**22,477**	**4,572**	**0**	**193,836**	**4,307**	**31,421**	**158,108**	**49,887**	**2,013**	**14,834**	**0**	**157,779**

[1] Includes naphtha less than 400 degrees F endpoint and other oils equal to or greater than 400 degrees F endpoint.
Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 23. Net Movements of Crude Oil and Petroleum Products by Pipeline, Tanker, and Barge Between PAD Districts, 1988
(Thousand Barrels)

Commodity	PAD District I			PAD District II			PAD District III			PAD District IV			PAD District V		
	Receipts into PADD I	Shipments from PADD I	Net Receipts PADD I	Receipts into PADD II	Shipments from PADD II	Net Receipts PADD II	Receipts into PADD III	Shipments from PADD III	Net Receipts PADD III	Receipts into PADD IV	Shipments from PADD IV	Net Receipts PADD IV	Receipts into PADD V	Shipments from PADD V	Net Receipts PADD V
Crude Oil	**22,044**	**38**	**22,006**	**611,365**	**39,385**	**571,980**	**253,238**	**552,818**	**-299,580**	**8,315**	**93,006**	**-84,691**	**0**	**209,715**	**-209,715**
Petroleum Products	**998,215**	**89,106**	**909,109**	**420,939**	**133,515**	**287,424**	**84,700**	**1,292,577**	**-1,207,877**	**21,725**	**50,053**	**-28,328**	**40,106**	**434**	**39,672**
Pentanes Plus	0	0	0	8,794	2,372	6,422	3,900	8,061	-4,161	0	2,261	-2,261	0	0	0
Liquefied Petroleum Gases	34,270	9	34,261	48,584	40,704	7,880	45,851	67,245	-21,394	1,164	21,911	-20,747	0	0	0
Unfinished Oils	2,122	4	2,118	1,198	348	850	348	4,166	-3,818	0	0	0	850	0	850
Blending Components															
Motor Gasoline	2,702	1,152	1,550	789	1,706	-917	1,002	1,759	-757	0	0	0	124	0	124
Aviation Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Finished Motor Gasoline	552,765	57,856	494,909	227,607	52,469	175,138	17,630	705,845	-688,215	11,377	16,438	-5,061	23,229	0	23,229
Finished Leaded Motor Gasoline	78,811	11,946	66,865	45,954	10,218	35,736	[illegible]2	110,769	-106,357	2,393	6,723	-4,330	8,086	0	8,086
Finished Unleaded Motor Gasoline	473,954	45,910	428,044	181,653	42,251	139,402	13,218	595,076	-581,858	8,984	9,715	-731	15,143	0	15,143
Finished Aviation Gasoline	1,933	80	1,853	1,413	226	1,187	35	3,335	-3,300	191	0	191	69	0	69
Naphtha-Type Jet Fuel	5,715	0	5,715	614	904	-290	904	8,906	-8,002	0	1,701	-1,701	4,278	0	4,278
Kerosene-Type Jet Fuel	126,752	3,603	123,149	41,507	11,105	30,402	1,851	163,724	-161,873	6,650	1,064	5,586	2,736	0	2,736
Kerosene	6,788	476	6,312	631	2,092	-1,461	1,638	6,489	-4,851	0	0	0	0	0	0
Distillate Fuel Oil	234,426	22,983	211,443	78,868	14,328	64,540	5,213	285,199	-279,986	2,343	6,678	-4,335	8,338	0	8,338
Residual Fuel Oil	7,182	23	7,159	554	3,364	-2,810	3,112	7,461	-4,349	0	0	0	0	0	0
Petrochemical Feedstocks[1]	758	827	-69	1,455	668	787	226	946	-718	0	0	0	0	0	0
Special Naphthas	3,246	34	3,214	1,607	13	1,594	46	4,854	-4,808	0	0	0	0	0	0
Lubricants	12,657	983	11,674	4,461	1,511	2,950	1,740	16,443	-14,703	0	0	0	482	403	79
Waxes	59	0	59	10	0	10	0	69	-69	0	0	0	0	0	0
Asphalt and Road Oil	5,914	814	5,100	2,834	1,556	1,278	814	7,192	-6,378	0	0	0	0	0	0
Miscellaneous Products	924	262	662	13	149	-136	388	883	-495	0	0	0	0	31	-31
Total	**1,020,259**	**89,144**	**931,115**	**1,032,304**	**172,900**	**859,404**	**337,938**	**1,845,395**	**-1,507,457**	**30,040**	**143,059**	**-113,019**	**40,106**	**210,149**	**-170,043**

[1] Includes naphtha less than 400 degrees F endpoint and other oils equal to or greater than 400 degrees F endpoint.
Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 24. Production of Residual Fuel Oil by Sulfur Content by PAD District, 1988
(Thousand Barrels)

Commodity	PAD District I			PAD District II				PAD District III						PAD Dist. IV	PAD Dist. V	United States
	East Coast	Appalachian No.1	Total	Ind., Ill., Ky.	Minn., Wisc., Daks.	Okla., Kans., Mo.	Total	Texas Inland	Texas Gulf Coast	La. Gulf Coast	N. La., Ark.	New Mexico	Total	Rocky Mt.	West Coast	
Residual Fuel Oil	**51,648**	**940**	**52,588**	**21,103**	**3,190**	**1,910**	**26,203**	**2,943**	**65,106**	**46,236**	**3,399**	**153**	**117,837**	**4,011**	**138,095**	**338,734**
0.00 to 0.30% Sulfur	11,189	180	11,369	579	0	0	579	971	707	8,562	851	61	11,152	746	12,390	36,236
0.31 to 1.00% Sulfur	29,707	291	29,998	4,211	22	985	5,218	705	10,330	5,244	1,928	92	18,299	354	17,809	71,678
Greater Than 1.00% Sulfur	10,752	469	11,221	16,313	3,168	925	20,406	1,267	54,069	32,430	620	0	88,386	2,911	107,896	230,820

Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 25. Stocks of Residual Fuel Oil by Sulfur Content by PAD District, December 31, 1988
(Thousand Barrels)

Commodity	PAD District I			PAD District II				PAD District III						PAD Dist. IV	PAD Dist. V	United States
	East Coast	Appalachian No.1	Total	Ind., Ill., Ky.	Minn., Wisc., Daks.	Okla., Kans., Mo.	Total	Texas Inland	Texas Gulf Coast	La. Gulf Coast	N. La., Ark.	New Mexico	Total	Rocky Mt.	West Coast	
Residual Fuel Oil – 0.00 to 0.30% Sulfur																
Refinery	238	43	281	28	0	0	28	56	72	807	3	3	943	99	622	1,973
Bulk Terminal	--	--	3,576	--	--	--	340	--	--	--	--	--	4	0	0	3,920
Total	**--**	**--**	**3,857**	**--**	**--**	**--**	**368**	**--**	**--**	**--**	**--**	**--**	**947**	**99**	**622**	**5,893**
Residual Fuel Oil – 0.31 to 1.00% Sulfur																
Refinery	1,431	26	1,457	394	0	60	454	18	653	186	34	1	892	280	932	4,015
Bulk Terminal	--	--	5,613	--	--	--	223	--	--	--	--	--	2,597	0	1,042	9,475
Total	**--**	**--**	**7,070**	**--**	**--**	**--**	**677**	**--**	**--**	**--**	**--**	**--**	**3,489**	**280**	**1,974**	**13,490**
Residual Fuel Oil – Greater than 1.00% Sulfur																
Refinery	782	0	782	1,431	365	90	1,886	100	2,954	1,665	50	0	4,769	284	3,964	11,685
Bulk Terminal	--	--	7,094	--	--	--	611	--	--	--	--	--	3,159	0	2,410	13,274
Total	**--**	**--**	**7,876**	**--**	**--**	**--**	**2,497**	**--**	**--**	**--**	**--**	**--**	**7,928**	**284**	**6,374**	**24,959**

Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 26. Movements of Residual Fuel Oil by Tanker and Barge Between PAD Districts, by Sulfur Content, 1988
(Thousand Barrels)

Commodity	From I to			From II to			From III to						From V to		
	II	III	V	I	III	V	I	New England	Central Atlantic	Lower Atlantic	II	V	I	II	III
Residual Fuel Oil	**23**	**0**	**0**	**252**	**3,112**	**0**	**6,930**	**423**	**3,560**	**2,947**	**531**	**0**	**0**	**0**	**0**
0.00 to 0.30% Sulfur	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.31 to 1.00% Sulfur	0	0	0	0	0	0	2,328	223	1,181	924	34	0	0	0	0
Greater Than 1.00% Sulfur	23	0	0	252	3,112	0	4,602	200	2,379	2,023	497	0	0	0	0

Sources and estimation procedures: See Explanatory Notes 1 and 2.

Table 27. Imports of Residual Fuel Oil by Sulfur Content by Country of Origin, 1988
(Thousand Barrels)

Country	Residual Fuel Oil			
	0.00 to 0.30%	0.31 to 1.00%	Greater Than 1.00%	Total
Arab OPEC				
Algeria	21,678	132	396	22,206
Iraq	0	0	0	0
Kuwait	0	0	130	130
Libya	0	0	0	0
Qatar	0	0	0	0
Saudi Arabia	0	0	522	522
United Arab Emirates	0	0	0	0
Subtotal Arab OPEC	21,678	132	1,048	22,858
Other OPEC				
Ecuador	359	0	4,715	5,074
Gabon	0	0	323	323
Indonesia	4,928	144	14	5,086
Iran	0	0	0	0
Nigeria	777	2,296	144	3,217
Venezuela	2,243	984	33,152	36,379
Subtotal Other OPEC	8,307	3,424	38,348	50,079
Other				
Angola	3,120	0	0	3,120
Australia	0	1,146	0	1,146
Bahamas	227	3,478	7,171	10,876
Bolivia	0	0	0	0
Brazil	5,013	1,494	2	6,509
Brunei	0	0	0	0
Canada	2,275	4,146	8,421	14,842
China, People's Republic	0	0	0	0
Congo	977	121	0	1,098
Egypt	0	350	0	350
France	0	1,267	1,014	2,281
Ghana	298	0	137	435
Liberia	0	0	0	0
Malaysia	126	0	0	126
Mexico	0	4	6,358	6,362
Netherlands	1,068	1,219	610	2,897
Netherlands Antilles	352	4,278	5,091	9,721
Norway	0	894	0	894
Oman	0	0	0	0
Peru	93	1,542	8,701	10,336
Puerto Rico	0	0	0	0
Romania	0	0	1,494	1,494
Spain	216	1,031	1,927	3,174
Syria	0	0	352	352
Trinidad	0	281	6,587	6,868
Tunisia	0	392	0	392
United Kingdom	656	6,865	1,721	9,242
Virgin Islands	8,054	4,943	15,920	28,917
Yugoslavia	0	0	0	0
Zaire	0	144	0	144
Other Western Hemisphere	1,310	2,241	9,443	12,994
Other Eastern Hemisphere	11,729	11,393	5,231	28,353
Subtotal Other	35,514	47,229	80,180	162,923
Total Imports	**65,499**	**50,785**	**119,576**	**235,860**

Note: Total may not equal sum of components due to independent rounding.
Sources and estimation procedures: See Explantory Notes 1 and 2.

Table 28. Imports of Residual Fuel Oil by Sulfur Content by State of Entry, 1988
(Thousand Barrels)

State	Residual Fuel Oil			
	0.00 to 0.30%	0.31 to 1.00%	Greater Than 1.00%	Total
PAD District I	**51,554**	**48,620**	**112,200**	**212,374**
Connecticut	0	1,996	556	2,552
Delaware	0	0	493	493
Florida	0	3,620	9,274	12,894
Georgia	0	0	1,141	1,141
Maine	291	1,978	7,998	10,267
Maryland	749	3,381	5,631	9,761
Massachusetts	709	9,295	21,744	31,748
New Hampshire	1,206	0	1,778	2,984
New Jersey	12,724	7,899	15,417	36,040
New York	34,105	12,913	24,505	71,523
North Carolina	136	0	5,777	5,913
Pennsylvania	1,297	4,633	6,477	12,407
Rhode Island	0	1,987	84	2,071
South Carolina	21	27	2,876	2,924
Vermont	0	0	76	76
Virginia	316	891	8,373	9,580
PAD District II	**1,055**	*	**817**	**1,873**
Illinois	62	*	107	169
Indiana	62	0	0	62
Michigan	931	1	130	1,062
Minnesota	0	0	52	52
North Dakota	0	0	399	399
Ohio	0	0	78	78
Wisconsin	0	0	51	51
PAD District III	**2,760**	**594**	**5,200**	**8,554**
Alabama	0	0	2,482	2,482
Louisiana	0	0	1,360	1,360
Texas	2,760	594	1,358	4,712
PAD District IV	**0**	**0**	**7**	**7**
Idaho	0	0	5	5
Montana	0	0	2	2
PAD District V	**10,130**	**1,570**	**1,352**	**13,052**
California	7,468	953	1,275	9,696
Hawaii	2,662	205	0	2,867
Oregon	0	73	0	73
Washington	0	339	77	416
All PAD Districts	**65,499**	**50,785**	**119,576**	**235,860**

Note: Total may not equal sum of components due to independent rounding.
Sources and estimation procedures: See Explanatory Notes 1 and 2.

Refinery Capacity

As part of the refining process, a catalytic cracking unit is used to increase the yield of gasoline from crude oil.

U.S. Refinery Activity - 1988

by Nancy Masterson

Introduction

As of January 1, 1989, U.S. operable crude oil distillation capacity declined to 15.7 million barrels per calendar day, 1.6 percent below the January 1, 1988 level (Table FE1). Concurrently, the number of refineries in operation decreased to 204, as 11 refineries were shut down (complete cessation of operations) in 1988 and 2 were reactivated.

While operable crude oil distillation capacity decreased, most downstream processes associated with gasoline production showed increases in capacities as of January 1, 1989. The exceptions were thermal cracking, which decreased 0.4 percent, and catalytic cracking (fresh and recycled) which declined by 2.7 percent from the January 1, 1988 level. This decrease in catalytic cracking is due almost entirely to two events. First, the shutdown of Shell Oil Company's Norco, Louisiana 100,000-barrel-per-stream-day unit which was severely damaged by fire in May 1988. The fire significantly reduced gasoline production at the site for two months. Shell does not expect this unit to be fully operational until 1991. Second, Unocal Corporation permanently shut down a 43,000-barrel-per-stream-day unit at their Nederland, Texas plant.

Table FE1. Number and Capacity of Operable Crude Oil Distillation Units at Petroleum Refineries as of January 1

Year	Number	Capacity (thousand barrels per calendar day)
1981	324	18,621
1982	301	17,890
1983	258	16,859
1984	247	16,137
1985	223	15,659
1986	216	15,459
1987[1]	219	15,566
1988	213	15,915
1989	204	15,655

[1] Beginning in 1987, the Hawaiian Independent Refinery (66,000 barrels per calendar day distillation capacity) is included in U.S. totals.

Source: Energy Information Administration, Form EIA-820, "Annual Refinery Report."

Total petroleum production at refineries during 1988 was 15.0 million barrels per day, the highest level reached since the 1980 level of 15.8 million barrels per day. Because of strong demand for motor gasoline, refiners boosted production during 1988 to 7.0 million barrels per day, 1.7 percent above the 1987 level.

Extreme weather conditions during 1988 adversely affected operations at some refineries along the Gulf Coast. Low water levels resulting from the prolonged drought of last summer affected refineries located along the lower Mississippi River south of New Orleans, Louisiana. Increasing salinity, the result of salt water from the Gulf of Mexico pushing north against the diminishing flow of the Mississippi River, threatened to hamper operations at those refineries. Several refiners resorted to barging in fresh water for use in their boilers, but most used river water for cooling.

In addition, in September, Hurricane Gilbert threatened 493,200 barrels per day of crude oil distillation capacity at five oil refineries in Corpus Christi, Texas which shut down or reduced their operations in anticipation of the storm.

Crude Oil Capacity and Utilization Rates

During 1988, crude oil distillation capacity averaged 15.9 million barrels per day. Strong growth in total petroleum demand (an average of 17.3 million barrels per day in 1988), coupled with falling crude oil prices, pushed the total U.S. refinery utilization rates for operable capacity to 84.4 percent, compared with 83.1 percent in 1987. The 1988 rate is the highest level since the 87.4 percent rate of 1978.[1] However,

[1] Energy Information Administration, *Annual Energy Review*, DOE/EIA-0384(87), Table 54.

Note: Unless otherwise indicated, data in this article were taken from the Summary Statistics section and Refinery Capacity section of this report, *Petroleum Supply Annual*, DOE/EIA-0340(88) Volumes 1 and 2 and predecessor reports.

For definitions of technical terms used in this article, see Glossary.

Oil-Producing Nations Invest in U.S. Refineries

During 1988 several U.S. refiners formed joint ventures with foreign oil-producing countries. There are several reasons a refiner/marketer would be interested in such joint ventures including obtaining a secure source of supply from the producing country, divesting unprofitable operations, helping solve cash flow problems, providing cash to modernize their plants, and stabilizing the type of crude oil coming to the plants. On the other hand, the oil exporting country has several reasons to buy into a refining/marketing operation: among them are that it provides a method to secure a market outlet and a chance to benefit from technology transfer.

One of the biggest joint ventures in the United States took place in November 1988 between Saudi Arabia and Texaco U.S.A. Saudi Arabia bought a 50 percent interest in three of Texaco's coastal refineries: Delaware City, Delaware; Port Arthur, Texas; and Convent, Louisiana. These refineries are now operating independently from Texaco under the name of Star Enterprise, and the combined capacity for these three plants, as of January 1, 1989, is 615,000 barrels per calendar day. These three refineries are designed specifically to handle Middle East crude oil, and this venture should provide secure access to Saudi Arabian crude oil at competitive prices.

As of December 1988, Petroleos de Venezuela owns 100 percent of the Champlin refinery in Corpus Christi, Texas. The capacity of this refinery as of January 1, 1989 was 130,000 barrels per calendar day. Petroleos de Venezuela also owns 50 percent of Citgo Petroleum Corporation's 305,000 barrel per day refinery in Lake Charles, Louisiana and in December 1988, signed an agreement to purchase 50 percent of Unocal's 147,000 barrel per day Lemont, Illinois refinery.

In addition, Pacific Refining Company sold 50 percent of its 55,000 barrel per day Hercules, California refinery to China's state-owned China National Chemical Import/Export Corporation (Sinochem). This joint-venture gave China its first investment in U.S. refining/marketing operations.

some operable capacity remained completely idle (refineries that did not report any inputs or production) during both 1987 and 1988. In 1987, 137,000 barrels per calendar day of crude oil distillation capacity remained completely idle throughout the year, and in 1988, this number increased to 347,000 barrels per calendar day. Omitting completely idle capacity, refinery utilization rates reached 86.3 percent in 1988, compared with 83.9 percent during 1987. The increased utilization rate during 1988 was primarily the result of a 3.4-percent increase in gross inputs to crude oil distillation units which reached a level of 13.4 million barrels per day in 1988 (Figure FE1).

Refinery utilization rates should continue to rise during 1989 if gross inputs to crude units continue the sustained growth that began in 1986 and crude oil distillation capacity does not drop below the level on January 1, 1989. According to responses to the 1989 Form EIA-820, "Annual Refinery Report," total crude oil distillation capacity was 15.7 million barrels per calendar day as of January 1, 1989, 1.6 percent below the level of January 1, 1988. This decrease occurred for two reasons. First, during 1988, 11 U.S. refineries were shut down and 2 refineries were reactivated (Table FE2). The net effect of the closings and reactivations was the reduction of operable crude oil distillation capacity by approximately 67,000 barrels per calendar day. (Two additional closings occurred in Puerto Rico and Guam; however, the capacity data are not included in U.S. totals.) Second, several operating refineries either downgraded their crude oil distillation capacity or permanently shut down capacity that had been listed as idle for the last few years, resulting in a further decrease of approximately 194,000 barrels per calendar day.

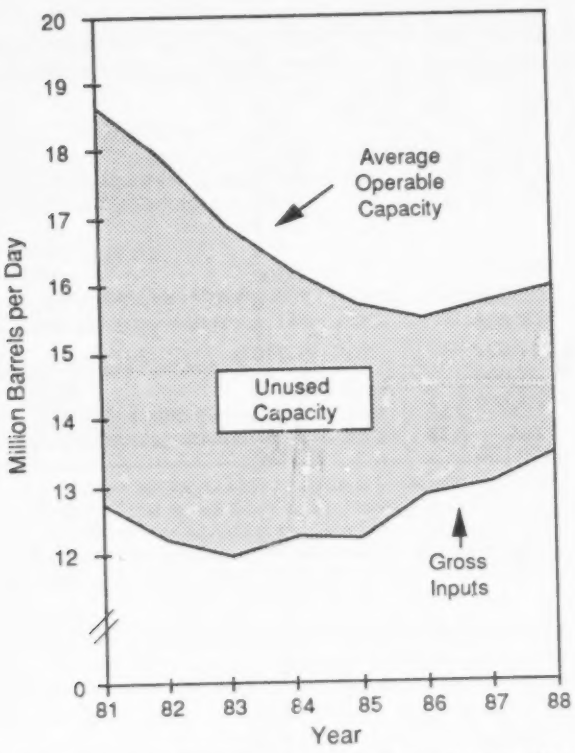
For example, Chevron U.S.A. performed major streamlining activities at several plants, reducing their total operable capacity by 242,000 barrels per calendar day. Most of this capacity had been idle for a year or more. The largest reductions ocurred at Chevron's Richmond, California refinery which permanently shut down 80,000 barrels per calendar day of crude oil capacity and at the Port Arthur, Texas and El Segundo, California plants, which shut down 78,000 and 75,000 barrels per calendar day of crude oil capacity, respectively.

Downstream Processing

During 1988, refiners upgraded the capacities of certain downsteam processing units to meet the increasing demand for high octane gasoline. Premium unleaded gasoline accounted for 23.1 percent of the domestic gasoline market during the summer of 1988 (June through August) compared to 18.8 percent of the market during the summer of 1987.[2]

[2] Energy Information Administration, *Petroleum Marketing Monthly*, DOE/EIA-0380(88/06), (88/07), (88/08), and (88/09), Table 41.

Figure FE1. Inputs and Average Operable Capacity 1981 - 1988[1]



[1] Capacities are the average of reported monthly operable capacities.

Sources: For 1981 through 1986, Energy Information Administration, *Annual Energy Review 1987*, Table 54. For 1987 and 1988, *Petroleum Supply Annual 1987* and *1988*.

Premium unleaded gasoline requires more extensive treatment by complex refinery processes than does regular unleaded gasoline. These motor gasoline-producing processes include thermal cracking (particularly delayed and fluid coking), catalytic cracking, catalytic hydrocracking, catalytic reforming, isomerization, and alkylation.

Thermal cracking is a process used to increase the yield of lighter products and to make petroleum coke. Fluid and delayed coking are thermal cracking processes used to break down heavy crudes and residual oils into a mixture of lighter oils and petroleum coke. Coking generally produces a significant gain in the volume of lighter oils produced compared to the volume of crude oil input to the coker. Charge capacity for fluid and delayed coking averaged 1.5 million barrels per stream day during 1988, an increase of 1.7 percent from the 1987 level (Table FE3). In addition, average fresh feed inputs to cokers increased 7.8 percent above the 1987 level, rendering an average utilization rate of 90.0 percent during 1988, compared with 84.9 percent in 1987.

The catalytic cracking process converts heavy gas oils into high octane gasoline and other light distillates. Catalytic cracking produces an 18-percent average gain in product volume.[3] The gasoline produced through catalytic cracking has higher octane ratings than gasoline produced using distillation or thermal cracking. The average charge capacity at refineries for catalytic cracking (fresh only) during 1988 rose to almost 5.4 million barrels per stream day, compared to the 1987 average level of 5.3 million barrels per stream day (Table FE3). Fresh feed input to these units increased from an average of 4.4 million barrels per stream day in 1987 to 4.5 million barrels per stream day in 1988. The average utilization rate for this process during 1988 was 84.0 percent, compared with 81.9 percent in 1987.

Catalytic hydrocracking is a process which uses hydrogen and a platinum-based catalyst to reduce heavy gas oils into gasoline, jet fuels, and diesel fuels. Because it can swing the refinery yields between these products, the hydrocracker is a pivotal unit in a complex refinery. This process produces no bottom-of-the-barrel leftovers, such as coke, pitch, or residuum. The output is all light oils. Hydrocracking is more effective than catalytic cracking in converting previously cracked gas oils to lighter products (hydrocracking produces a 25-percent average gain in product volume).[4] The average utilization rate for hydrocrackers dropped to 76.3 percent in 1988, down from 79.1 percent during the previous year, as fresh feed inputs to these units dropped by 1.6 percent from 1987, and their average capacity level grew by 2.0 percent (Table FE3).

Catalytic reforming is an important process for upgrading low octane naphthas to a high octane blending component (reformate). As the octane number of the reformate goes up, the percentage volume (yield) of reformate goes down. This is because, to obtain higher octane gasoline, the reformer is operated at extremely high temperatures, resulting in a greater volume of gas components as opposed to liquids. Thus, production of premium unleaded gasoline requires greater supplies of low octane naphthas, and consequently greater supplies of crude oil, than does production of regular unleaded gasoline. Charge capacity for catalytic reforming increased to 3.9 million barrels per stream day as of January 1, 1989, 0.5 percent above the previous year's level (Table FE4).

Isomerization is a process used to increase the octane number of the light gasoline components, normal pentane and normal hexane, which are abundant in light straight run gasoline. Alkylation is a reaction process that combines the olefins, propylene and butylene, with isobutane to form alkylate, a high octane compound in the gasoline range. Isomerization production capacity rose 0.9 percent during 1988 to a level of 468,723 barrels per stream day as of January 1, 1989. Alkylation production capacity was 1.0 million barrels per stream day as of January 1, 1989, 2.2 percent higher than for the previous year (Table FE4).

[3] William L. Leffler, *Petroleum Refining for the Non-Technical Person*, PennWell Publishing Company, Tulsa, Oklahoma, 1985, p. 45.
[4] William L. Leffler, *Petroleum Refining for the Non-Technical Person*, p. 83.

Table FE2. Refinery Closings and Reactivations During 1988

Refinery	Location	Crude Oil Distillation Capacity (barrels per calendar day)	Downstream Capacity (barrels per stream day)	Operating History (years in operation)
Closings:				
Amber Refining Inc.	Fort Worth, Texas	19,700	17,700	40 +
Flying J. Petroleum Inc.	Cutbank, Montana	5,600	7,700	40 +
GAMXX Energy Inc.	Theodore, Alabama	27,000	10,000	1
Kentucky Oil & Refining	Betsy Layne, Kentucky	600	0	39
Liquid Energy Corp.	Bridgeport, Texas	10,000	0	9
Motor Oils Refining	McCook, Illinois	1,500	1,200	6
Mountaineer Refining Co., Inc.	LaBarge, Wyoming	350	0	16
OGC Corp.	Egan, Louisiana	5,000	0	2
Seminole Refining Corp.	St. Marks, Florida	17,000	11,390	33
Texas NAPCO Inc.	St. James, Louisiana	17,000	20,000	20
West Coast Oil Co.	Oildale, California	5,000	0	40 +
Total U.S. Closings		**108,750**	**67,990**	
Additional Closings:				
Caribbean Gulf Refining Corp.	San Juan, Puerto Rico	36,000	57,800	NA
Guam Oil & Refining Co.	Agana, Guam	43,900	1,400	NA
Reactivations:				
American International Refining Inc.	Lake Charles, Louisiana	27,000	21,600	
Western Slope Refining Co.	Fruita, Colorado	15,200	27,100	
Total Reactivations		**42,200**	**48,700**	

NA=Not available.
Source: Energy Information Administration, Form EIA-820, "Annual Refinery Report".

An examination of motor gasoline-producing downstream units since 1981 reveals that capacities for some of these processes have increased substantially despite the number of refinery closings during this period. For example, although the number of operating refineries dropped from a historic high of 324 on January 1, 1981, to 204 on January 1, 1989, fluid and delayed coking capacity grew by 48.5 percent and catalytic hydrocracking capacity grew by 36.2 percent during that time period (Table FE4). On January 1, 1989, fluid and delayed coking capacity was 1.5 million barrels per stream day, about the same level as on January 1, 1988, while total charge capacity for catalytic hydrocracking increased 3.0 percent from January 1, 1988, to January 1, 1989.

Catalytic cracking capacity (fresh and recycled) dropped between 1981 and 1986 due primarily to the permanent shutdown of more than 100 refineries during that period, but rose in 1987 and 1988 before dropping again on January 1, 1989. The charge capacity at refineries for catalytic cracking decreased to 5.7 million barrels per stream day as of January 1, 1989, 2.7 percent below the January 1, 1988, level (Table FE4). This decrease is due almost entirely to the shutdown of two units. First, an explosion in Shell Oil's Norco, Louisiana catalytic cracker shut down 100,000 barrels per stream day of capacity. Shell does not expect this unit to be fully operational until 1991. Second, Unocal Corporation began downgrading its Nederland, Texas refinery in September 1988. The downgrading includes permanent shutdown of their 43,000-barrels-per-stream-day catalytic cracking unit and phasing out fuels production. This refinery will concentrate on producing lubricating oils, aromatics, and solvents.

Catalytic reforming charge capacity also dropped between 1981 and 1986 and then began increasing in 1987 (Table FE4). Catalytic reforming charge capacity was 4.1 million barrels per stream day on January 1, 1981, compared with 3.9 million barrels per stream day on January 1, 1989.

Production capacity for isomerization, a process designed to raise the octane level of gasoline, more than tripled between 1981 and 1989 (Table FE4). This process experienced a 59.4-percent increase in production capacity between 1981 and 1982. Production capacity levels dropped slightly in 1983 and 1984 but began climbing again in 1985 and have shown substantial increases every year since then. The most recent growth in isomerization capacity occurred not only because of

Table FE3. Refinery Inputs, Capacity, and Utilization of Motor Gasoline - Producing Downstream Units, by PAD District, 1987 and 1988
(Thousand Barrels per Stream Day, Except Where Noted)

	PAD District I		PAD District II		PAD District III		PAD District IV		PAD District V		United States	
	1987	1988	1987	1988	1987	1988	1987	1988	1987	1988	1987	1988
Fresh Feed Inputs												
Cokers	63	70	233	262	509	552	16	16	444	464	1,265	1,364
Catalytic Crackers (fresh)	503	543	999	988	2,075	2,171	145	153	648	659	4,370	4,514
Catalytic Hydrocrackers	51	53	112	119	385	356	6	5	393	397	946	931
Average Capacity [1]												
Cokers	80	81	287	293	593	597	25	27	504	517	1,490	1,515
Catalytic Crackers (fresh)	606	592	1,206	1,231	2,580	2,596	192	190	753	766	5,337	5,374
Catalytic Hydrocrackers	74	81	160	162	489	503	7	8	466	466	1,196	1,220
Utilization Rate (percent) [2]												
Cokers	78.4	86.3	81.2	89.2	85.9	92.5	63.0	58.0	88.0	89.8	84.9	90.0
Catalytic Crackers (fresh)	83.1	91.8	82.8	80.3	80.4	83.6	75.4	80.7	86.1	86.0	81.9	84.0
Catalytic Hydrocrackers	68.3	65.6	69.8	73.5	78.8	70.7	80.2	64.8	84.4	85.3	79.1	76.3

[1] Capacities are the average of January 1 operable capacities for the indicated year and the following year.
[2] Utilization rate is expressed as a percentage and represents inputs divided by capacity. Utilization rate is based on unrounded data.
Note: Totals may not add to sum of components due to independent rounding.
Source: Energy Information Administration, *Petroleum Supply Annual*, DOE/EIA-0340, Volume 1, Refinery Capacity section, Tables 11 and 31

Table FE4. Capacity of Motor Gasoline-Producing Downstream Units, 1981-1989
(Thousand Barrels per Stream Day)

	Charge Capacity					Production Capacity	
	Thermal Cracking						
Year[1]	Fluid & Delayed Coking	Visbreaking & Other	Catalytic Cracking (Fresh & Recycled)	Catalytic Hydrocracking	Catalytic Reforming	Isomerization	Alkylation
1981	1,021	566	6,136	909	4,098	138	974
1982	1,146	635	6,036	892	3,966	220	984
1983	1,198	518	5,891	883	3,918	212	960
1984	1,393	459	5,802	952	3,907	208	945
1985	1,407	451	5,738	1,053	3,750	219	917
1986	1,435	444	5,677	1,125	3,744	258	941
1987	1,464	464	5,716	1,189	3,805	326	974
1988	1,515	565	5,806	1,202	3,891	465	993
1989	1,516	557	5,650	1,238	3,911	469	1,015

[1] As of January 1 of year.
Source: Energy Information Administration, Form EIA-820, "Annual Refinery Report" and predecessor forms.

increased consumer demand for higher octane unleaded gasoline, but also because of full implementation of the Environmental Protection Agency's (EPA) lead phasedown rule which reduces the allowable gasoline lead content to 0.1 gram per gallon.

In addition, in March 1989, the EPA announced new gasoline volatility standards for the 1989 summer driving season. The measure of volatility, Reid Vapor Pressure (RVP), is the measure of the surface pressure it takes to keep gasoline from vaporizing. The higher the RVP of the gasoline, the more easily it will evaporate, causing increased levels of air pollution. The ideal RVP for gasoline varies with the seasons.

Under the new EPA regulations, average summertime RVP specifications for gasoline produced by refineries can range between 9.0 pounds per square inch (psi) and 10.5 psi, varying by locality, a drop from the previous limit of 11.5 psi. EPA has set some of the toughest standards for Arizona and New Mexico, where the especially hot, dry summer weather contributes to high smog levels in urban areas. The EPA standards for these two States will be 9.5 psi in May, 9.0 psi in June through August, and 9.5 psi in September. California, Texas, and Nevada will generally be limited to 9.5 psi throughout most of the summer months (with a few exceptions of 10.5 psi in May in areas of each State), but Los Angeles will be limited to a gasoline volatility rating of 9.0 psi.

Most of the country will be limited to a gasoline RVP level of 10.5. Nevertheless, concern over serious smog problems along the highly urban, heavily-traveled Northeast prompted New York, New Jersey, and the New England States to sign an agreement in late 1987 to limit gasoline volatility in that region to 9.0 psi during the summer of 1989, well below the EPA specifications. The Clean Air Act prohibits States from adopting standards stricter than the Federal Government, but several of these States have asked for waivers.

EPA noted that the volatility reductions are the maximum possible without installation of capital equipment at refineries. However, this regulation will have an impact on refiners as they will have to find low volatility octane enhancers for use in motor gasoline blending. Normally, butanes are used as a motor gasoline blending component. However, since the RVP of normal butane is 52 psi, refiners are searching for substitutes for butanes as a motor gasoline blending component. Low volatility substitutes in use now include the ether compound MTBE, and the more expensive xylene and toluene.

Refinery Yields

Refinery yields[5] (percentage of how much product results from the processing of one barrel of crude oil) are based on the ratio of the production of finished products to the inputs of crude oil and net inputs of unfinished oils.

Refiners input about 391,000 barrels per day more crude oil and unfinished oils in 1988 than they did in 1987 to produce about the same yield of motor gasoline (approximately 46 percent) (Table FE5). This is due, in part, to the increased production of premium unleaded gasoline. Higher crude oil inputs are required because the catalytic reforming process used to produce premium unleaded fuel raised the octane level of gasoline but resulted in greater processing losses. In addition, during 1988 refiners diverted some of the feedstocks once used to make gasoline to a rapidly expanding petrochemical industry. The greater emphasis on petrochemical plants has helped trim gasoline yields and sparked higher crude oil inputs to keep up with the strong demand for gasoline.

The annual refinery yield of distillate fuel oil has remained fairly steady since 1978, fluctuating between 19.7 percent (in 1980) and 21.6 percent (in 1985). The distillate yield in 1988 was 20.8 percent, compared with 20.5 percent in 1987.

In a reversal of the trend of recent years, residual fuel oil yields increased in 1988, while yields of jet fuel remained stable. Yields of residual fuel oil declined from 11.7 percent in 1980 to 6.6 percent in 1987 before increasing to 6.7 percent in 1988. In contrast, refinery yields of jet fuel increased from 7.4 percent in 1980 to 10.0 percent in 1987 and 1988.

During the 1980's, a number of factors have influenced the yield pattern for residual fuel oil and jet fuel. Residual fuel oil demand plummeted after price controls were removed in 1980. Demand increased for lighter products, such as motor gasoline, distillate fuel oil, and jet fuel during this same period. The ability of refiners to convert residual fuel oil into lighter products increased with the addition of downstream

[5] See Table 13 of this volume.

Table FE5. Total Refinery Inputs, Motor Gasoline Production and Motor Gasoline Yields, 1981 - 1988
(Thousand Barrels per Day, Except Where Noted)

Year	Total[1] Inputs	Finished Motor Gasoline Refinery Production			Yield[2] (Percent)
		Leaded	Unleaded	Total	
1981	12,756	3,201	3,197	6,400	44.5
1982	12,123	2,993	3,339	6,336	46.2
1983	12,003	2,836	3,502	6,338	47.4
1984	12,465	2,571	3,882	6,453	46.5
1985	12,443	2,281	4,138	6,419	45.6
1986	13,167	2,096	4,656	6,752	45.7
1987	13,326	1,668	5,174	6,841	46.4
1988	13,717	1,302	5,654	6,956	46.0

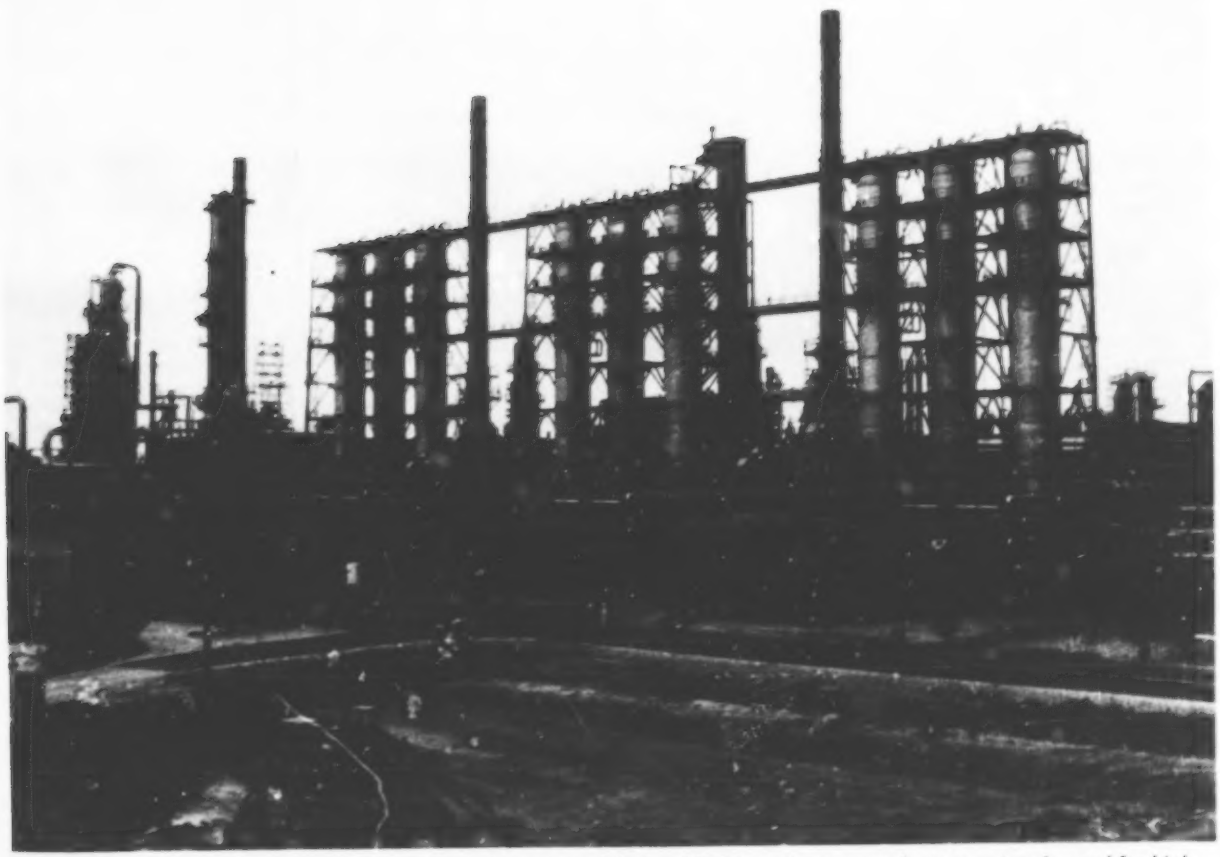
[1] Crude plus net reruns of unfinished oils.
[2] Based on total finished motor gasoline output plus net output of motor gasoline blending components, minus input of natural gas plant liquids, other hydrocarbons and alcohol.
Note: Shaded areas are not used to calculate yields.
Source: Energy Information Administration, *Petroleum Supply Annual*, DOE/EIA-0340(88)/1, Tables 3 and 13, and predecessor reports.

capacity during the 1980's. When demand for residual fuel oil increased and its price was low relative to that of crude oil in 1986, it was more economical to import residual fuel oil than to increase refinery yields of this product. In 1988, residual fuel oil demand showed the second increase in 3 years, but the price differential between residual fuel oil and crude oil was less than in 1986. Consequently, imports of residual fuel oil were lower than in 1986, while refinery yields were at the same rate.

Crude Oil Receipts at Refineries

During 1988, total crude oil received at refineries rose 3.4 percent to an average of 13.5 million barrels per day, as receipts of foreign crude oil more than offset a 1.7-percent decline in domestic crude oil receipts from the 1987 daily average. Refinery receipts of domestic crude oil (including Alaskan) in 1988 averaged 8.2 million barrels per day. Receipts of Alaskan crude oil increased by 4.2 percent over the 1987 level to 1.8 million barrels per day.

Refinery receipts of foreign crude oil rose from 4.7 million barrels per day in 1987 to 5.3 million barrels per day in 1988, an increase of 12.6 percent. This is the third consecutive year in which foreign crude oil receipts have increased and domestic receipts have decreased from the previous year. However, domestic receipts still comprise a majority of the total crude oil received at refineries: about 61 percent of the total in 1988 compared to 64 percent during 1987.



Capacity upgrading to downstream processing units occurred during 1988 in order to meet the increasing demand for high octane gasoline. Shown above are processing towers in a Gulf Coast refinery.

Table 29. Number and Capacity of Operable Petroleum Refineries by PAD District and State as of January 1, 1989

District and State	Number of Operable Refineries			Atmospheric Crude Oil Distillation Capacity					
				Barrels per Calendar Day			Barrels per Stream Day		
	Total	Operating	Idle[1]	Total	Operating	Idle	Total	Operating	Idle
PAD District I	**24**	**22**	**2**	**1,433,752**	**1,395,752**	**38,000**	**1,524,500**	**1,483,500**	**41,000**
Delaware	1	1	0	140,000	140,000	0	150,000	150,000	0
Georgia	2	1	1	33,079	5,079	28,000	35,000	6,000	29,000
New Jersey	6	6	0	400,000	400,000	0	434,000	434,000	0
New York	1	1	0	41,850	41,850	0	45,000	45,000	0
North Carolina	2	1	1	13,000	3,000	10,000	15,500	3,500	12,000
Pennsylvania	8	8	0	734,315	734,315	0	770,500	770,500	0
Virginia	2	2	0	54,700	54,700	0	57,000	57,000	0
West Virginia	2	2	0	16,808	16,808	0	17,500	17,500	0
PAD District II	**39**	**38**	**1**	**3,262,500**	**3,261,000**	**1,500**	**3,428,303**	**3,425,803**	**2,500**
Illinois	6	6	0	889,200	889,200	0	942,000	942,000	0
Indiana	5	4	1	430,400	428,900	1,500	444,100	441,600	2,500
Kansas	8	8	0	349,300	349,300	0	370,483	370,483	0
Kentucky	2	2	0	218,900	218,900	0	226,300	226,300	0
Michigan	3	3	0	113,500	113,500	0	121,000	121,000	0
Minnesota	2	2	0	247,100	247,100	0	264,220	264,220	0
North Dakota	1	1	0	58,000	58,000	0	60,000	60,000	0
Ohio	4	4	0	484,600	484,600	0	507,000	507,000	0
Oklahoma	6	6	0	381,500	381,500	0	399,200	399,200	0
Tennessee	1	1	0	58,000	58,000	0	60,000	60,000	0
Wisconsin	1	1	0	32,000	32,000	0	34,000	34,000	0
PAD District III	**74**	**69**	**5**	**7,362,147**	**6,822,597**	**539,550**	**7,813,507**	**7,208,207**	**605,300**
Alabama	5	4	1	153,600	144,100	9,500	159,300	149,300	10,000
Arkansas	3	3	0	58,400	51,400	7,000	61,000	53,000	8,000
Louisiana	22	20	2	2,627,147	2,286,147	341,000	2,791,400	2,396,900	394,500
Mississippi	6	6	0	368,400	368,400	0	390,900	390,900	0
New Mexico	4	4	0	75,600	75,600	0	84,607	84,607	0
Texas	34	32	2	4,079,000	3,896,950	182,050	4,326,300	4,133,500	192,800
PAD District IV	**18**	**17**	**1**	**549,875**	**526,875**	**23,000**	**570,950**	**546,950**	**24,000**
Colorado	3	2	1	87,200	72,000	15,200	92,000	76,000	16,000
Montana	4	4	0	138,450	130,650	7,800	143,200	135,200	8,000
Utah	6	6	0	154,500	154,500	0	160,000	160,000	0
Wyoming	5	5	0	169,725	169,725	0	175,750	175,750	0
PAD District V	**49**	**47**	**2**	**3,046,600**	**3,005,600**	**41,000**	**3,230,723**	**3,185,849**	**44,874**
Alaska	6	6	0	215,000	215,000	0	232,460	232,460	0
California	32	31	1	2,235,300	2,206,200	29,100	2,379,809	2,347,689	32,120
Hawaii	2	2	0	126,500	126,500	0	130,000	130,000	0
Nevada	1	1	0	4,500	4,500	0	4,700	4,700	0
Oregon	1	1	0	0	0	0	0	0	0
Washington	7	6	1	465,300	453,400	11,900	483,754	471,000	12,754
U.S. Total	**204**	**193**	**11**	**15,654,874**	**15,011,824**	**643,050**	**16,567,983**	**15,850,309**	**717,674**
Puerto Rico	2	2	0	85,000	85,000	0	87,000	87,000	0
Virgin Islands	1	1	0	545,000	470,000	75,000	595,000	510,000	85,000

See footnotes at end of table.

Table 29. Number and Capacity of Operable Petroleum Refineries by PAD District and State as of January 1, 1989 (Continued)

District and State	Downstream Charge Capacity (Barrels per Stream Day)							
	Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Reforming	Catalytic Hydrocracking	Catalytic Hydrotreating	Fuels Solvent Deasphalting
			Fresh	Recycled				
PAD District I	**722,575**	**81,000**	**581,300**	**50,800**	**356,950**	**87,000**	**902,370**	**16,000**
Delaware	95,000	46,000	65,000	5,000	56,000	19,000	110,000	0
Georgia	0	0	0	0	0	0	3,000	0
New Jersey	244,100	21,500	251,000	37,000	77,500	17,000	284,500	0
New York	27,000	0	0	0	0	0	0	0
North Carolina	0	0	0	0	0	0	0	0
Pennsylvania	319,300	0	238,300	6,800	208,400	51,000	479,620	16,000
Virginia	29,000	13,500	27,000	2,000	9,750	0	25,250	0
West Virginia	8,175	0	0	0	5,300	0	0	0
PAD District II	**1,363,750**	**375,700**	**1,234,600**	**59,100**	**914,100**	**162,390**	**1,919,800**	**39,500**
Illinois	349,400	124,900	343,000	12,000	292,300	67,500	588,100	0
Indiana	233,200	28,500	167,000	6,000	99,500	0	233,700	5,000
Kansas	124,650	53,000	124,500	9,000	97,500	3,190	215,500	5,500
Kentucky	92,000	57,600	100,000	0	53,500	0	182,300	10,000
Michigan	38,000	0	45,000	1,000	33,000	0	60,300	0
Minnesota	167,000	54,000	78,000	1,000	55,500	0	221,000	0
North Dakota	0	0	26,000	5,200	12,100	0	16,600	0
Ohio	185,000	30,700	176,000	17,500	161,600	87,200	194,500	9,000
Oklahoma	142,000	27,000	132,500	6,400	91,100	4,500	158,000	10,000
Tennessee	12,000	0	30,000	0	10,000	0	35,000	0
Wisconsin	20,500	0	12,600	1,000	8,000	0	14,800	0
PAD District III	**3,283,550**	**1,001,800**	**2,547,900**	**156,475**	**1,817,900**	**513,000**	**4,710,425**	**110,000**
Alabama	50,000	12,000	0	0	26,000	0	59,300	0
Arkansas	23,300	0	18,500	775	9,000	0	18,500	5,500
Louisiana	1,144,700	545,500	846,800	12,300	524,200	149,000	1,246,275	5,000
Mississippi	273,950	70,500	72,000	9,000	96,000	68,000	254,000	0
New Mexico	13,900	0	27,100	6,100	19,200	0	29,200	0
Texas	1,777,700	373,800	1,583,500	128,300	1,143,500	296,000	3,103,150	99,500
PAD District IV	**206,850**	**29,400**	**187,070**	**29,420**	**116,230**	**9,900**	**236,220**	**9,000**
Colorado	33,000	4,200	23,500	1,000	19,900	5,000	29,900	0
Montana	53,350	7,700	52,170	6,620	35,530	4,900	118,270	4,000
Utah	45,500	8,500	49,400	9,600	28,550	0	39,250	5,000
Wyoming	75,000	9,000	62,000	12,200	32,250	0	48,800	0
PAD District V	**1,648,500**	**585,000**	**773,450**	**30,050**	**705,700**	**465,400**	**1,671,080**	**70,000**
Alaska	6,000	0	0	0	12,000	9,000	0	0
California	1,347,000	502,000	648,950	14,050	559,900	388,500	1,463,280	50,000
Hawaii	58,000	13,000	22,000	3,000	12,000	15,900	3,500	0
Nevada	2,500	0	0	0	0	0	0	0
Oregon	16,000	0	0	0	0	0	0	0
Washington	219,000	70,000	102,500	13,000	121,800	52,000	204,300	20,000
U.S. Total	**7,225,225**	**2,072,900**	**5,324,320**	**325,845**	**3,910,880**	**1,237,690**	**9,439,895**	**244,500**
Puerto Rico	45,000	0	0	0	72,800	15,600	80,000	0
Virgin Islands	215,000	85,000	0	0	115,000	0	420,000	0

[1] Refineries where distillation units are completely idle but not permanently shutdown on January 1, 1989.

Source: Form EIA-820, "Annual Refinery Report."

Table 30. Production Capacity of Operable Petroleum Refineries by PAD District and State as of January 1, 1989
(Barrels per Stream Day, Except Where Noted)

District and State	Production Capacity							
	Alkylates	Asphalt	Aromatics	Isomers	Lubricants	Hydrogen (MMcfd)	Marketable Petroleum Coke	Sulfur (short tons/ day)
PAD District I	**79,500**	**164,730**	**19,170**	**36,950**	**34,912**	**113**	**21,050**	**4,455**
Delaware	8,000	0	3,370	0	0	40	10,900	350
Georgia	0	23,880	0	0	0	0	0	0
New Jersey	24,500	94,850	3,500	25,000	8,500	16	5,050	3,592
New York	0	13,000	0	0	0	0	0	0
Pennsylvania	47,000	33,000	12,300	11,950	20,200	56	0	440
Virginia	0	0	0	0	0	0	5,100	73
West Virginia	0	0	0	0	6,212	1	0	0
PAD District II	**260,100**	**263,500**	**54,069**	**139,943**	**31,625**	**154**	**70,455**	**3,429**
Illinois	87,500	36,200	7,300	5,000	4,600	39	23,500	1,411
Indiana	34,200	46,000	13,000	23,200	6,400	0	10,540	561
Kansas	36,300	7,500	10,169	40,000	0	0	10,300	267
Kentucky	12,000	30,000	5,400	12,250	7,900	20	0	200
Michigan	8,800	28,000	0	1,100	0	0	0	95
Minnesota	14,000	69,000	0	23,300	0	20	15,000	534
North Dakota	3,400	0	0	4,000	0	0	0	17
Ohio	25,800	14,500	16,000	10,693	3,000	65	6,190	245
Oklahoma	34,000	18,800	2,200	20,400	9,725	10	4,925	40
Tennessee	2,500	0	0	0	0	0	0	45
Wisconsin	1,600	13,500	0	0	0	0	0	14
PAD District III	**494,800**	**213,985**	**213,008**	**254,680**	**134,725**	**1,108**	**132,860**	**11,250**
Alabama	0	23,000	0	800	0	6	2,000	140
Arkansas	4,400	10,750	0	5,000	3,235	4	0	21
Louisiana	197,500	67,410	28,633	112,220	37,090	182	60,510	3,087
Mississippi	20,700	41,700	5,500	0	5,000	217	17,700	1,260
New Mexico	3,200	4,100	0	4,000	0	0	0	0
Texas	269,000	67,025	178,875	132,660	89,400	699	52,650	6,742
PAD District IV	**34,430**	**50,890**	**0**	**15,700**	**1,600**	**25**	**5,376**	**128**
Colorado	1,200	4,000	0	1,200	0	6	1	36
Montana	12,180	26,740	0	4,650	0	19	2,175	37
Utah	11,400	3,200	0	6,350	0	0	1,750	13
Wyoming	9,650	16,950	0	3,500	1,600	0	1,450	42
PAD District V	**146,200**	**129,683**	**3,300**	**21,450**	**26,800**	**1,101**	**102,930**	**9,107**
Alaska	0	8,200	1,800	4,000	0	13	0	15
California	116,900	92,683	1,500	13,200	26,800	985	85,430	8,814
Hawaii	4,500	1,300	0	1,500	0	23	0	0
Oregon	0	11,500	0	0	0	0	0	0
Washington	24,800	16,000	0	2,750	0	80	17,500	278
U.S. Total	**1,015,030**	**822,788**	**289,547**	**468,723**	**229,662**	**2,501**	**332,671**	**28,369**
Puerto Rico	0	0	15,000	0	9,500	19	0	68
Virgin Islands	0	0	35,000	18,000	0	0	0	580

MMcfd = Million cubic feet per day.
Source: Form EIA-820, "Annual Refinery Report."

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Table 31. **Capacity of Operable Petroleum Refineries by State as of January 1, 1989**
(Barrels per Stream Day, Except Where Noted)

Refiner	Refineries on Page(s)
Amerada Hess Corp.	84, 85, 86, 87, 98, 99
American International Refinery Inc.	82, 83
Amoco Oil Co.	78, 79, 80, 81, 88, 89, 90, 91, 94, 95, 96, 97
Arco Alaska Inc.	74, 75
Arco Products Co.	74, 75, 96, 97
Ashland Oil Inc.	82, 83, 84, 85, 88, 89
Atlantic Refining & Marketing Corp.	90, 91
Barrett Refining Corp.	88, 89
Belcher Refining Co.	74, 75
Berry Petroleum Co.	74, 75
Big West Oil Co.	94, 95
Bloomfield Refining Co.	88, 89
BP Oil Corp.	82, 83, 88, 89, 90, 91, 96, 97
Calcasieu Refining Co.	82, 83
Calumet Refining Co.	82, 83
Canal Refining Co.	82, 83
Cenex	86, 87
Champlin Refining Co.	90, 91
Chemoil Refining Corp.	74, 75
Chevron U.S.A. Inc.	74, 75, 78, 79, 86, 87, 90, 91, 94, 95, 96, 97
Cibro Petroleum Products Inc.	88, 89
Citgo Petroleum Corp.	82, 83
City Gas & Transmission Corp.	88, 89
Claiborne Gasoline Co.	82, 83
Clark Oil & Refining Corp.	80, 81
Coastal Eagle Point Oil Co.	86, 87
Coastal Refining & Marketing Inc.	92, 93
Colorado Refining Co.	78, 79
Conoco Inc.	76, 77, 78, 79, 82, 83, 86, 87, 88, 89
Cross Oil & Refining Co. of Arkansas	74, 75
Crown Central Petroleum Corp.	92, 93
Crysen Refining Inc.	94, 95
Crystal Refining Co.	84, 85
Derby Refining Co.	80, 81
Diamond Shamrock Refining & Marketing Co.	92, 93
Donna Refinery Partners Ltd.	92, 93
Edgington Oil Co.	76, 77
El Paso Refining Co. Ltd.	92, 93
Endevco Inc.	82, 83
Ergon Refining Inc.	86, 87
Exxon Co. U.S.A.	76, 77, 82, 83, 86, 87, 92, 93
Farmland Industries Inc.	80, 81
Fina Oil & Chemical Co.	92, 93
Fletcher Oil & Refining Co.	76, 77
Frontier Refining Co.	96, 97
Giant Refining Co.	88, 89
Gibson Oil & Refining Co. Inc.	76, 77
GNC Energy Corp.	88, 89
Golden West Refining Co.	76, 77
Hawaiian Independent Refinery Inc.	78, 79
Hill Petroleum Co.	82, 83, 92, 93
Howell Hydrocarbons Corp.	92, 93
Hunt Oil Co.	74, 75
Huntway Refining Co.	76, 77
Indiana Farm Bureau Cooperative Association	80, 81
Kentucky Oil & Refining Co.	80, 81
Kern Oil & Refining Co.	76, 77
Kerr-McGee Refining Corp.	82, 83, 88, 89
Koch Refining Co.	84, 85, 92, 93
La Gloria Oil & Gas Co.	92, 93
Laketon Refining Corp.	80, 81
Leal Petroleum Corp.	92, 93
Lion Oil Co.	74, 75
Little America Refining Co.	96, 97
LL&E Petroleum Marketing Inc.	74, 75
Lunday Thagard Co.	76, 77
Lyondell Petrochemical Co.	92, 93
Mapco Petroleum Inc.	74, 75, 90, 91
Marathon Petroleum Co.	80, 81, 82, 83, 84, 85, 92, 93
Mid Atlantic Fuels Inc.	96, 97
Mobil Oil Corp.	76, 77, 80, 81, 84, 85, 86, 87, 92, 93
Montana Refining Co.	86, 87
Murphy Oil U.S.A. Inc.	84, 85, 96, 97
National Cooperative Refinery Association	80, 81
Navajo Refining Co.	88, 89
Nevada Refining Co.	86, 87
Newhall Refining Co. Inc.	76, 77
Pacific Refining Co.	76, 77
Paramount Petroleum Corp.	76, 77
Pennzoil Products Co.	84, 85, 90, 91, 94, 95
Petro Source Resources Inc.	86, 87
Petro Star	74, 75
Petrolite Corp.	94, 95
Phillips Puerto Rico Core Inc.	98, 99
Phillips 66 Co.	94, 95
Placid Refining Co.	84, 85
Powerine Oil Co.	76, 77
Pride Refining Inc.	94, 95
Primary Oil & Energy Corp.	96, 97
Quaker State Oil Refining Corp.	90, 91, 96, 97
Rock Island Refining Corp.	80, 81
San Joaquin Refining Co. Inc.	76, 77
Seaview Petroleum Inc.	86, 87
Shell Oil Co.	76, 77, 80, 81, 84, 85, 94, 95, 96, 97
Sinclair Oil Corp.	88, 89, 96, 97
Somerset Refinery Inc.	82, 83
Sound Refining Inc.	96, 97
South Hampton Refining Co.	94, 95
Southland Oil Co.	86, 87
Southwestern Refining Co. Inc.	94, 95
Star Enterprise	78, 79, 84, 85, 94, 95
Sun Co Inc.	88, 89, 90, 91, 98, 99
Sunland Refining Corp.	76, 77
Tenby Inc.	76, 77
Tesoro Petroleum Corp.	74, 75
Texaco Refining & Marketing Inc.	78, 79, 80, 81, 96, 97
Thriftway Co.	88, 89
Tosco Corp.	78, 79
Total Petroleum Inc.	82, 83, 84, 85, 88, 89
Trans America Refining Co.	84, 85
Trifinery	94, 95
U.S. Oil & Refining Co.	96, 97
Ultramar Refining	78, 79
United Refining Co.	90, 91
Unocal Corp.	78, 79, 80, 81, 94, 95
Valero Refining Co.	94, 95
Vulcan Refining Co.	74, 75
Warrior Asphalt Refining Corp.	74, 75
Western Slope Refining Co.	78, 79
Witco Corp.	78, 79, 90, 91
Wyoming Refining Co.	98, 99
Young Refining Corp.	78, 79

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Reforming
	Operating	Idle	Operating	Idle			Fresh	Recycled	
Alabama	**144,100**	**9,500**	**149,300**	**10,000**	**50,000**	**12,000**	**0**	**0**	**26,000**
Belcher Refining Co.									
Chickasaw	26,600	0	28,000	0	10,000	0	0	0	0
Hunt Oil Co.									
Tuscaloosa	33,500	0	35,000	0	15,000	[1] 12,000	0	0	[2] 6,000
LL&E Petroleum Marketing Inc.									
Saraland	80,000	0	81,300	0	20,000	0	0	0	[6] 20,000
Vulcan Refining Co.									
Cordova	0	9,500	0	10,000	5,000	0	0	0	0
Warrior Asphalt Refining Corp.									
Holt	4,000	0	5,000	0	0	0	0	0	0
Alaska	**215,000**	**0**	**232,460**	**0**	**6,000**	**0**	**0**	**0**	**12,000**
Arco Alaska Inc.									
Anchorage	12,000	0	13,000	0	0	0	0	0	0
Prudhoe Bay	12,000	0	18,000	0	0	0	0	0	0
Chevron U.S.A. Inc.									
Kenai	22,000	0	22,500	0	0	0	0	0	0
Mapco Petroleum Inc.									
North Pole	90,000	0	91,760	0	6,000	0	0	0	0
Petro Star									
North Pole	7,000	0	7,200	0	0	0	0	0	0
Tesoro Petroleum Corp.									
Kenai	72,000	0	80,000	0	0	0	0	0	[2] 12,000
Arkansas	**51,400**	**7,000**	**53,000**	**8,000**	**23,300**	**0**	**18,500**	**775**	**9,000**
Berry Petroleum Co.									
Stephens	3,700	0	4,000	0	1,500	0	0	0	0
Cross Oil & Refining Co. of Arkansas									
Smackover	6,700	0	7,000	0	3,300	0	0	0	0
Lion Oil Co.									
El Dorado	41,000	7,000	42,000	8,000	18,500	0	18,500	775	[2] 9,000
California	**2,206,200**	**29,100**	**2,347,689**	**32,120**	**1,347,000**	**502,000**	**648,950**	**14,050**	**559,900**
Arco Products Co.									
Los Angeles	214,000	0	225,000	0	112,000	[1] 56,000	82,000	0	[6] 48,000
Chemoil Refining Corp. (Formerly Macmillan Petroleum Co.)									
Long Beach	14,200	0	16,200	0	0	0	0	0	0
Chevron U.S.A. Inc.									
El Segundo	330,000	0	380,000	0	179,000	[1] 54,000	60,000	0	[2] 25,000 [6] 35,000
Richmond	270,000	0	280,000	0	175,000	0	63,000	0	[2] 50,000 [6] 18,000

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

Location	Downstream Charge Capacity (Cont.)			Production Capacity							
	Catalytic Hydro-cracking	Catalytic Hydro-treating	Fuels Solvent Deasphalting	Alkylates	Asphalt	Aromatics	Isomers	Lubricants	Hydrogen (MMcfd)	Marketable Petroleum Coke	Sulfur (short tons/ day)
Alabama	**0**	**59,300**	**0**	**0**	**23,000**	**0**	**800**	**0**	**6**	**2,000**	**140**
Chickasaw	0	0	0	0	8,000	0	0	0	0	0	0
Tuscaloosa	0	[3] 9,800 [4] 7,500 [5] 5,000	0	0	9,500	0	0	0	6	2,000	80
Saraland	0	[3] 15,000 [4] 22,000	0	0	0	0	[7] 800	0	0	0	60
Cordova	0	0	0	0	2,500	0	0	0	0	0	0
Holt	0	0	0	0	3,000	0	0	0	0	0	0
Alaska	**9,000**	**0**	**0**	**0**	**8,200**	**1,800**	**4,000**	**0**	**13**	**0**	**15**
Anchorage	0	0	0	0	0	0	0	0	0	0	0
Prudhoe Bay	0	0	0	0	0	0	0	0	0	0	0
Kenai	0	0	0	0	6,000	0	0	0	0	0	0
North Pole	0	0	0	0	2,200	1,800	0	0	0	0	0
North Pole	0	0	0	0	0	0	0	0	0	0	0
Kenai	9,000	0	0	0	0	0	[8] 4,000	0	13	0	15
Arkansas	**0**	**18,500**	**5,500**	**4,400**	**10,750**	**0**	**5,000**	**3,235**	**4**	**0**	**21**
Stephens	0	0	0	0	1,000	0	0	0	0	0	0
Smackover	0*	[9] 3,000	0	0	2,050	0	0	3,235	4	0	0
El Dorado	0	[4] 10,000 [5] 5,500	5,500	4,400	7,700	0	[8] 5,000	0	0	0	21
California	**388,500**	**1,463,280**	**50,000**	**116,900**	**92,683**	**1,500**	**13,200**	**26,800**	**985**	**85,430**	**8,814**
Los Angeles	22,000	[3] 70,000 [4] 40,000 [5] 18,000 [9] 18,000	0	9,000	0	0	0	0	70	10,000	180
Long Beach	0	0	0	0	0	0	0	0	0	0	0
El Segundo	45,000	[3] 60,000 [4] 56,000 [5] 14,000 [9] 42,000	0	8,000	0	1,500	0	0	112	14,500	840
Richmond	105,500	[3] 60,000 [4] 63,000 [5] 65,000 [9] 18,200	50,000	9,200	11,000	0	0	11,800	135	0	672

[1] Delayed Coking [2] Low Pressure [3] Heavy Gas Oil [4] Naph./Ref. Feeds [5] Distillate [6] High Pressure
[7] C_4 [8] C_5 and C_6 [9] Other/Residual [10] Fluid Coking [11] Visbreaking [12] Other/Gas Oil

E = Estimated. MMcfd = Million cubic feet per day.
* Reported no inputs during 1988.
Source: Form EIA-820, "Annual Refinery Report."

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Reforming
	Operating	Idle	Operating	Idle			Fresh	Recycled	
California (Continued)									
Conoco Inc.									
Santa Maria	9,500	0	10,000	0	7,800	0	0	0	0
Edgington Oil Co.									
Long Beach	41,600	0	44,800	0	27,000	0	0	0	0
Exxon Co. U.S.A.									
Benicia	128,000	0	132,000	0	67,000	[10] 27,500	64,000	11,000	[6] 28,000
Fletcher Oil & Refining Co.									
Carson	29,500	0	31,709	0	0	0	9,450	1,050	[6] 4,200
Gibson Oil & Refining Co. Inc. *									
Bakersfield	0	9,600	0	9,800	0	0	0	0	0
Golden West Refining Co.									
Santa Fe Springs	42,000	0	45,000	0	25,000	[11] 13,800	13,500	0	[6] 19,000
Huntway Refining Co.									
Benicia	8,500	0	9,000	0	7,600	0	0	0	0
Wilmington	5,500	0	6,000	0	5,000	0	0	0	0
Kern Oil & Refining Co.									
Bakersfield	21,400	0	23,000	0	0	0	0	0	[6] 3,000
Lunday Thagard Co.									
South Gate	8,100	0	8,500	0	7,000	0	0	0	0
Mobil Oil Corp.									
Torrance	123,000	0	130,000	0	95,000	[1] 48,000	63,000	0	[6] 36,000
Newhall Refining Co. Inc.									
Newhall	E 13,000	E 9,500	E 13,680	E 10,320	E 10,000	0	0	0	[2] E 2,500
Pacific Refining Co.									
Hercules	55,000	0	57,000	0	20,000	[11] 12,000	0	0	[6] 15,000
Paramount Petroleum Corp.									
Paramount	46,500	0	48,000	0	28,000	0	0	0	[5] 11,500
Powerine Oil Co.									
Santa Fe Springs	35,000	0	35,900	0	20,000	[10] 12,000	12,000	0	[2] 8,200
San Joaquin Refining Co. Inc.									
Bakersfield	14,300	10,000	15,000	12,000	12,000	[11] 5,000	0	0	0
Shell Oil Co.									
Carson	125,000	0	129,000	0	75,000	[1] 53,000	42,000	0	[6] 24,000
Martinez	140,100	0	143,000	0	96,500	[10] 22,000	67,000	1,000	[2] 28,000
Sunland Refining Corp.									
Bakersfield	12,000	0	17,000	0	0	0	0	0	0
Tenby Inc.									
(Formerly Oxnard Refinery)									
Oxnard	4,000	0	5,000	0	0	0	0	0	0

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

Location	Downstream Charge Capacity (Cont.)			Production Capacity							
	Catalytic Hydro-cracking	Catalytic Hydro-treating	Fuels Solvent Deasphalting	Alkylates	Asphalt	Aromatics	Isomers	Lubricants	Hydrogen (MMcfd)	Marketable Petroleum Coke	Sulfur (short tons/ day)
California (Continued)											
Santa Maria	0	0	0	0	6,800	0	0	0	0	0	0
Long Beach	0	0	0	0	18,000	0	0	0	0	0	0
Benicia	29,500	[3] 37,000 [4] 44,500 [5] 25,000 [9] 17,000	0	14,000	0	0	0	0	104	5,500	304
Carson	0	[3] 10,500	0	0	0	0	0	0	0	0	0
Bakersfield	0	0	0	0	0	0	0	0	0	0	0
Santa Fe Springs	11,000	[4] 12,000	0	3,000	0	0	0	0	11	0	30
Benicia	0	0	0	0	4,500	0	0	0	0	0	0
Wilmington	0	0	0	0	2,750	0	0	0	0	0	0
Bakersfield	0	[4] 3,000	0	0	0	0	0	0	0	0	0
South Gate	0	0	0	0	5,833	0	0	0	0	0	0
Torrance	21,700	[3] 68,000 [4] 37,000 [5] 28,000	0	17,000	0	0	0	0	137	14,500	589
Newhall	0	[3] E 5,000 [4] E 2,500 [5] E 6,500	0	0	E 4,600	0	0	0	0	0	E 4,000
Hercules	4,000	[4] 15,000	0	0	0	0	0	0	0	0	0
Paramount	0	[5] 7,000 [9] 21,500	0	0	15,000	0	0	0	0	0	0
Santa Fe Springs	8,000	[3] 13,500 [4] 8,500 [5] 6,000	0	3,200	0	0	[7] 1,800	0	18	2,250	42
Bakersfield	0	0	0	0	8,000	0	0	0	0	0	0
Carson	0	[4] 25,000 [5] 32,000 [9] 48,000	0	8,600	0	0	0	0	36	12,500	448
Martinez	27,000	[3] 50,000 [4] 17,000 [5] 19,000 [9] 37,300	0	8,000	11,000	0	0	4,500	110	635	268
Bakersfield	0	0	0	0	0	0	0	0	0	0	0
Oxnard	0	0	0	0	1,200	0	0	0	0	0	0

[1] Delayed Coking [2] Low Pressure [3] Heavy Gas Oil [4] Naph./Ref. Feeds [5] Distillate [6] High Pressure
[7] C_4 [8] C_5 and C_6 [9] Other/Residual [10] Fluid Coking [11] Visbreaking [12] Other/Gas Oil

E = Estimated. MMcfd = Million cubic feet per day.
* Reported no inputs during 1988.
Source: Form EIA-820, "Annual Refinery Report."

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Reforming
	Operating	Idle	Operating	Idle			Fresh	Recycled	
California (Continued)									
Texaco Refining & Marketing Inc.									
Bakersfield	47,000	0	48,000	0	23,000	[1] 11,800	0	0	[6] 23,000
Wilmington	57,000	0	60,000	0	42,000	[1] 48,000	28,000	0	[6] 38,000
Tosco Corp.									
Martinez	126,000	0	132,600	0	105,000	[10] 48,000	60,000	1,000	[2] 23,000 [6] 20,000
Ultramar Refining (Formerly Union Pacific Resources Co.)									
Wilmington	65,000	0	71,000	0	35,000	[1] 24,000	38,000	0	[2] 14,500
Unocal Corp.									
Arroyo Grande	41,000	0	44,000	0	32,000	[1] 23,200	0	0	0
Rodeo	71,900	0	76,300	0	42,100	[1] 23,700	0	0	[2] 16,000 [6] 18,000
Wilmington	108,000	0	111,000	0	89,000	[11] 20,000	47,000	0	[2] 36,000 [6] 16,000
Witco Corp.									
Oildale	0	0	0	0	10,000	0	0	0	0
Colorado	**72,000**	**15,200**	**76,000**	**16,000**	**33,000**	**4,200**	**23,500**	**1,000**	**19,900**
Colorado Refining Co.									
Commerce City	28,000	0	30,000	0	10,000	0	8,500	0	[2] 9,000
Conoco Inc.									
Commerce City	44,000	0	46,000	0	13,000	0	15,000	1,000	[6] 7,500
Western Slope Refining Co. * (Formerly Gary Energy Corp.)									
Fruita	0	15,200	0	16,000	10,000	[1] 4,200	0	0	[6] 3,400
Delaware	**140,000**	**0**	**150,000**	**0**	**95,000**	**46,000**	**65,000**	**5,000**	**56,000**
Star Enterprise (Formerly Texaco Refining & Marketing Inc.)									
Delaware City	140,000	0	150,000	0	95,000	[10] 46,000	65,000	5,000	[2] 38,000 [6] 18,000
Georgia	**5,079**	**28,000**	**6,000**	**29,000**	**0**	**0**	**0**	**0**	**0**
Amoco Oil Co.									
Savannah	0	28,000	0	29,000	0	0	0	0	0
Young Refining Corp.									
Douglasville	5,079	0	6,000	0	0	0	0	0	0
Hawaii	**126,500**	**0**	**130,000**	**0**	**58,000**	**13,000**	**22,000**	**3,000**	**12,000**
Chevron U.S.A. Inc.									
Honolulu	48,000	0	50,000	0	28,000	0	22,000	3,000	0
Hawaiian Independent Refinery Inc.									
Ewa Beach	78,500	0	80,000	0	30,000	[11] 13,000	0	0	[2] 12,000

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

Location	Downstream Charge Capacity (Cont.)			Production Capacity							
	Catalytic Hydrocracking	Catalytic Hydrotreating	Fuels Solvent Deasphalting	Alkylates	Asphalt	Aromatics	Isomers	Lubricants	Hydrogen (MMcfd)	Marketable Petroleum Coke	Sulfur (short tons/day)
California (Continued)											
Bakersfield	14,300	[3] 15,000 [4] 14,000	0	0	0	0	0	0	21	3,125	44
Wilmington	20,000	[4] 18,000 [5] 12,000	0	4,400	0	0	0	0	48	8,250	309
Martinez	23,000	[3] 50,000 [4] 13,500 [5] 28,000	0	12,000	0	0	0	0	80	1,500	200
Wilmington	0	[3] 40,000 [4] 15,000	0	10,500	0	0	[7] 4,000	0	0	1,200	120
Arroyo Grande	0	0	0	0	0	0	0	0	0	6,020	153
Rodeo	32,500	[4] 23,000 [5] 9,500 [9] 14,500	0	0	0	0	[8] 7,400	4,500	65	5,450	392
Wilmington	25,000	[4] 54,000 [5] 36,200	0	10,000	0	0	0	0	38	0	224
Oildale	0	[5] 580	0	0	4,000	0	0	6,000	0	0	0
Colorado	**5,000**	**29,900**	**0**	**1,200**	**4,000**	**0**	**1,200**	**0**	**6**	**1**	**36**
Commerce City	0	[4] 9,000	0	1,200	0	0	0	0	0	0	8
Commerce City	0	[4] 7,500 [5] 10,000	0	0	4,000	0	0	0	0	0	19
Fruita	5,000	[4] 3,400	0	0	0	0	[7] 600 [8] 600	0	6	1	9
Delaware	**19,000**	**110,000**	**0**	**8,000**	**0**	**3,370**	**0**	**0**	**40**	**10,900**	**350**
Delaware City	19,000	[4] 55,000 [5] 55,000	0	8,000	0	3,370	0	0	40	10,900	350
Georgia	**0**	**3,000**	**0**	**0**	**23,880**	**0**	**0**	**0**	**0**	**0**	**0**
Savannah	0	0	0	0	20,880	0	0	0	0	0	0
Douglasville	0	[4] 540 [5] 1,200 [9] 1,260	0	0	3,000	0	0	0	0	0	0
Hawaii	**15,900**	**3,500**	**0**	**4,500**	**1,300**	**0**	**1,500**	**0**	**23**	**0**	**0**
Honolulu	0	[9] 3,500	0	4,500	1,300	0	[7] 1,500	0	3	0	0
Ewa Beach	15,900	0	0	0	0	0	0	0	20	0	0

[1] Delayed Coking [2] Low Pressure [3] Heavy Gas Oil [4] Naph./Ref. Feeds [5] Distillate [6] High Pressure
[7] C_4 [8] C_5 and C_6 [9] Other/Residual [10] Fluid Coking [11] Visbreaking [12] Other/Gas Oil

E = Estimated. MMcfd = Million cubic feet per day.
* Reported no inputs during 1988.
Source: Form EIA-820, "Annual Refinery Report."

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Reforming
	Operating	Idle	Operating	Idle			Fresh	Recycled	
Illinois	**889,200**	**0**	**942,000**	**0**	**349,400**	**124,900**	**343,000**	**12,000**	**292,300**
Clark Oil & Refining Corp.									
Blue Island	64,600	0	68,000	0	27,000	0	25,000	1,000	[6] 30,500
Hartford	63,600	0	65,000	0	18,000	[1] 14,500	26,000	1,000	[6] 12,000
Marathon Petroleum Co.									
Robinson	160,000	0	170,000	0	45,500	[1] 21,500 [12] 5,000	42,000	0	[2] 42,000 [6] 35,000
Mobil Oil Corp.									
Joliet	180,000	0	200,000	0	88,000	[1] 38,000	98,000	0	[6] 46,000
Shell Oil Co.									
Wood River	274,000	0	286,000	0	108,000	[11] 18,000	94,000	0	[2] 75,000 [6] 22,000
Unocal Corp.									
Lemont	147,000	0	153,000	0	62,900	[1] 27,900	58,000	10,000	[6] 29,800
Indiana	**428,900**	**1,500**	**441,600**	**2,500**	**233,200**	**28,500**	**167,000**	**6,000**	**99,500**
Amoco Oil Co.									
Whiting	350,000	0	360,000	0	203,000	[1] 28,500	140,000	4,000	[6] 85,000
Indiana Farm Bureau Cooperative Association									
Mount Vernon	21,200	0	22,600	0	7,200	0	8,000	200	[6] 4,500
Kentucky Oil & Refining Co.									
Troy	0	1,500	0	2,500	0	0	0	0	0
Laketon Refining Corp.									
Laketon	8,700	0	9,500	0	6,000	0	0	0	0
Rock Island Refining Corp.									
Indianapolis	49,000	0	49,500	0	17,000	0	19,000	1,800	[2] 10,000
Kansas	**349,300**	**0**	**370,483**	**0**	**124,650**	**53,000**	**124,500**	**9,000**	**97,500**
Derby Refining Co.									
El Dorado	30,400	0	32,000	0	10,000	0	14,000	2,000	[6] 5,700
Wichita	28,800	0	31,300	0	10,000	[1] 5,000	17,000	2,500	[6] 7,000
Derby Refining Co. (Formerly Augusta Refining Co.)									
Augusta	0	0	0	0	0	0	0	0	[2] 7,500
Farmland Industries Inc.									
Coffeyville	56,500	0	60,723	0	19,500	[1] 13,000	23,000	1,500	[6] 16,000
Phillipsburg	26,400	0	27,460	0	10,000	0	0	0	[6] 5,300
National Cooperative Refinery Association									
McPherson	75,600	0	80,000	0	27,000	[1] 22,000	20,000	500	[6] 15,000
Texaco Refining & Marketing Inc.									
El Dorado	78,000	0	83,000	0	32,000	[1] 13,000	31,500	2,500	[6] 25,000

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

Location	Downstream Charge Capacity (Cont.)			Production Capacity							
	Catalytic Hydrocracking	Catalytic Hydrotreating	Fuels Solvent Deasphalting	Alkylates	Asphalt	Aromatics	Isomers	Lubricants	Hydrogen (MMcfd)	Marketable Petroleum Coke	Sulfur (short tons/day)
Illinois	**67,500**	**588,100**	**0**	**87,500**	**36,200**	**7,300**	**5,000**	**4,600**	**39**	**23,500**	**1,411**
Blue Island	11,000	[4] 20,500	0	6,000	4,500	0	0	0	0	0	20
Hartford	0	[4] 12,000 [5] 12,000	0	8,000	0	0	0	0	0	3,750	110
Robinson	23,000	[4] 65,000 [5] 23,000 [9] 11,500	0	8,500	0	0	[8] 5,000	0	0	6,000	40
Joliet	0	[4] 81,000 [5] 75,000	0	25,000	0	0	0	0	0	11,750	347
Wood River	33,500	[3] 29,000 [4] 64,000 [5] 52,500 [9] 45,500	0	22,000	28,500	3,800	0	4,600	28	0	504
Lemont	0	[3] 4,300 [4] 53,800 [5] 39,000	0	18,000	3,200	3,500	0	0	11	2,000	390
Indiana	**0**	**233,700**	**5,000**	**34,200**	**46,000**	**13,000**	**23,200**	**6,400**	**0**	**10,540**	**561**
Whiting	0	[3] 80,000 [4] 67,000 [5] 42,000 [9] 5,200	0	26,000	40,000	13,000	[8] 21,000	6,400	0	10,540	540
Mount Vernon	0	[4] 6,000	0	1,700	2,200	0	[8] 2,200	0	0	0	0
Troy	0	0	0	0	0	0	0	0	0	0	0
Laketon	0	0	0	0	3,800	0	0	0	0	0	0
Indianapolis	0	[4] 13,500	5,000	6,500	0	0	0	0	0	0	21
Kansas	**3,190**	**215,500**	**5,500**	**36,300**	**7,500**	**10,169**	**40,000**	**0**	**0**	**10,300**	**267**
El Dorado	0	[4] 5,500 [5] 4,000	5,500	3,300	5,500	0	0	0	0	0	0
Wichita	0	[4] 7,000	0	3,000	0	0	0	0	0	1,050	0
Augusta	0	[4] 13,500	0	0	0	7,200	[8] 5,500	0	0	0	0
Coffeyville	0	[4] 26,500 [5] 5,000	0	6,000	0	0	[8] 8,000	0	0	3,000	8
Phillipsburg	0	[4] 7,500	0	0	2,000	0	0	0	0	0	0
McPherson	0	[4] 24,500 [5] 13,000	0	6,000	0	0	[7] 2,000 [8] 9,500	0	0	3,200	46
El Dorado	0	[3] 44,000 [4] 40,000 [5] 9,000	0	12,500	0	2,969	[8] 15,000	0	0	3,050	200

[1] Delayed Coking [2] Low Pressure [3] Heavy Gas Oil [4] Naph./Ref. Feeds [5] Distillate [6] High Pressure
[7] C_4 [8] C_5 and C_6 [9] Other/Residual [10] Fluid Coking [11] Visbreaking [12] Other/Gas Oil

E = Estimated. MMcfd = Million cubic feet per day.
* Reported no inputs during 1988.
Source: Form EIA-820, "Annual Refinery Report."

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Reforming
	Operating	Idle	Operating	Idle			Fresh	Recycled	
Kansas (Continued)									
Total Petroleum Inc.									
Arkansas City	53,600	0	56,000	0	16,150	0	19,000	0	[2] 10,000 [6] 6,000
Kentucky	**218,900**	**0**	**226,300**	**0**	**92,000**	**57,600**	**100,000**	**0**	**53,500**
Ashland Oil Inc.									
Catlettsburg	213,400	0	220,000	0	92,000	[11] 2,600 [12] 55,000	100,000	0	[2] 27,000 [6] 25,500
Somerset Refinery Inc.									
Somerset	5,500	0	6,300	0	0	0	0	0	[6] 1,000
Louisiana	**2,286,147**	**341,000**	**2,396,900**	**394,500**	**1,144,700**	**545,500**	**846,800**	**12,300**	**524,200**
American International Refinery Inc. *									
(Formerly Lake Charles Refining Co.)									
Lake Charles	0	27,000	0	30,000	0	0	0	0	[2] 10,800
BP Oil Corp.									
(Formerly Standard Oil Co.)									
Belle Chasse	213,640	0	218,000	0	75,000	[1] 18,000	88,000	2,300	[6] 37,500
Calcasieu Refining Co.									
Lake Charles	13,500	0	14,000	0	0	0	0	0	0
Calumet Refining Co.									
Princeton	4,207	0	4,400	0	4,400	0	0	0	0
Canal Refining Co.									
Church Point	8,000	0	8,800	0	0	0	0	0	[2] 1,900
Citgo Petroleum Corp.									
Lake Charles	305,000	0	330,000	0	83,000	[1] 63,000	150,000	0	[2] 71,000 [6] 20,000
Claiborne Gasoline Co.									
Lisbon	7,500	0	7,700	0	0	0	0	0	[2] 2,000
Conoco Inc.									
Egan	2,800	0	3,000	0	0	0	0	0	0
Westlake	156,500	0	164,000	0	63,000	[1] 53,000 [12] 12,000	40,000	0	[2] 11,500 [6] 15,900
Endevco Inc.									
(Formerly Kerr-McGee Refining Corp.)									
Dubach	10,000	0	11,000	0	0	0	0	0	[2] 2,200
Exxon Co. U.S.A.									
Baton Rouge	455,000	0	474,000	0	205,000	[1] 90,000	155,000	0	[2] 60,000 [6] 30,000
Hill Petroleum Co.									
Krotz Springs	57,500	0	60,000	0	24,000	0	28,000	0	[6] 10,400
St.Rose	34,000	0	35,000	0	18,000	0	0	0	0
Kerr-McGee Refining Corp.									
Cotton Valley	7,800	0	8,500	0	0	0	0	0	0
Marathon Petroleum Co.									
Garyville	255,000	0	263,000	0	125,000	0	85,000	0	[2] 50,000

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

Location	Downstream Charge Capacity (Cont.)			Production Capacity							
	Catalytic Hydrocracking	Catalytic Hydrotreating	Fuels Solvent Deasphalting	Alkylates	Asphalt	Aromatics	Isomers	Lubricants	Hydrogen (MMcfd)	Marketable Petroleum Coke	Sulfur (short tons/day)
Kansas (Continued)											
Arkansas City	3,190	[4] 16,000	0	5,500	0	0	0	0	0	0	13
Kentucky	**0**	**182,300**	**10,000**	**12,000**	**30,000**	**5,400**	**12,250**	**7,900**	**20**	**0**	**200**
Catlettsburg	0	[3] 40,000 [4] 84,000 [5] 40,000 [9] 17,000	10,000	12,000	30,000	5,400	[6] 12,000	7,900	20	0	200
Somerset	0	[4] 1,300	0	0	0	0	[8] 250	0	0	0	0
Louisiana	**149,000**	**1,246,275**	**5,000**	**197,500**	**67,410**	**28,633**	**112,220**	**37,090**	**182**	**60,510**	**3,087**
Lake Charles	0	[4] 10,800	0	0	0	0	0	0	0	0	0
Belle Chasse	0	[4] 42,000 [5] 46,000	0	35,000	0	16,533	0	0	0	860	56
Lake Charles	0	0	0	0	0	0-	0	0	0	0	0
Princeton	0	[3] 4,400	0	0	910	0	0	3,490	0	0	0
Church Point	0	0	0	0	0	0	0	0	0	0	0
Lake Charles	37,000	[4] 91,000 [5] 14,000 [9] 40,000	0	20,200	0	0	0	9,300	0	15,000	342
Lisbon	0	0	0	0	0	0	[8] 2,000	0	0	0	0
Egan	0	0	0	0	0	0	0	0	0	0	0
Westlake	0	[4] 33,000 [5] 109,000 [9] 13,500	0	7,500	0	2,100	0	0	0	7,000	290
Dubach	0	[4] 1,675	0	0	0	0	[7] 100 [8] 120	0	1	0	0
Baton Rouge	24,000	[4] 97,500 [5] 55,000 [9] 19,000	0	33,200	28,900	0	[8] 7,500	16,500	18	24,900	661
Krotz Springs	0	[4] 13,000	0	0	0	0	[7] 1,500	0	0	0	10
St.Rose	0	0	0	0	0	0	0	0	0	0	0
Cotton Valley	0	0	0	0	0	0	0	0	0	0	0
Garyville	0	[3] 71,000 [4] 50,000 [5] 40,000	0	26,400	25,000	0	[7] 7,000 [8] 9,000	0	0	0	504

[1] Delayed Coking [2] Low Pressure [3] Heavy Gas Oil [4] Naph./Ref. Feeds [5] Distillate [6] High Pressure
[7] C_4 [8] C_5 and C_6 [9] Other/Residual [10] Fluid Coking [11] Visbreaking [12] Other/Gas Oil

E = Estimated. MMcfd = Million cubic feet per day.
* Reported no inputs during 1988.
Source: Form EIA-820, "Annual Refinery Report."

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Reforming
	Operating	Idle	Operating	Idle			Fresh	Recycled	
Louisiana (Continued)									
Mobil Oil Corp.									
(Formerly Tenneco Oil Co.)									
Chalmette	145,000	0	155,000	0	70,000	[1] 33,000	51,000	0	[2] 19,000 [6] 28,000
Murphy Oil U.S.A. Inc.									
Meraux	78,500	14,000	80,500	14,500	40,000	0	35,300	3,000	[2] 23,000
Pennzoil Products Co.									
Shreveport	46,200	0	50,000	0	24,300	0	0	0	[6] 10,000
Placid Refining Co.									
Port Allen	46,000	0	50,000	0	20,000	0	18,500	2,000	[2] 10,000
Shell Oil Co.									
Norco	215,000	0	220,000	0	78,000	[1] 21,000 [12] 103,500	0	0	[2] 38,000 [6] 18,000
Star Enterprise									
(Formerly Texaco Refining & Marketing Inc.)									
Convent	225,000	0	240,000	0	75,000	[11] 12,000	85,000	5,000	[6] 40,000
Trans America Refining Co. *									
Good Hope	0	300,000	0	350,000	240,000	[11] 140,000	110,000	0	[6] 15,000
Michigan	**113,500**	**0**	**121,000**	**0**	**38,000**	**0**	**45,000**	**1,000**	**33,000**
Crystal Refining Co.									
Carson City	3,000	0	6,000	0	0	0	0	0	0
Marathon Petroleum Co.									
Detroit	68,500	0	71,000	0	38,000	0	26,000	1,000	[2] 12,500 [6] 6,500
Total Petroleum Inc.									
Alma	42,000	0	44,000	0	0	0	19,000	0	[2] 14,000
Minnesota	**247,100**	**0**	**264,220**	**0**	**167,000**	**54,000**	**78,000**	**1,000**	**55,500**
Ashland Oil Inc.									
St. Paul	67,100	0	69,220	0	32,000	0	23,000	0	[6] 22,500
Koch Refining Co.									
St. Paul	180,000	0	195,000	0	135,000	[1] 54,000	55,000	1,000	[2] 26,000 [6] 6,000
Mississippi	**368,400**	**0**	**390,900**	**0**	**273,950**	**70,500**	**72,000**	**9,000**	**96,000**
Amerada Hess Corp.									
Purvis	30,000	0	32,000	0	0	[10] 8,500	16,000	7,000	[6] 6,000

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

Location	Downstream Charge Capacity (Cont.)			Production Capacity							
	Catalytic Hydrocracking	Catalytic Hydrotreating	Fuels Solvent Deasphalting	Alkylates	Asphalt	Aromatics	Isomers	Lubricants	Hydrogen (MMcfd)	Marketable Petroleum Coke	Sulfur (short tons/day)
Louisiana (Continued)											
Chalmette	18,000	[1] 13,000 [4] 45,000 [5] 24,000	0	19,000	0	7,000	0	0	24	7,750	200
Meraux	0	[4] 29,000 [5] 15,000	0	8,700	12,000	0	0	0	0	0	24
Shreveport	0	[3] 8,200 [4] 10,000 [9] 1,200	0	0	600	0	0	7,800	6	0	13
Port Allen	0	[4] 11,000	5,000	4,000	0	0	0	0	0	0	6
Norco	35,000	[3] 70,000 [4] 29,000 [9] 28,000	0	15,000	0	0	0	0	70	5,000	113
Convent	35,000	[4] 40,000 [5] 37,000 [9] 65,000	0	14,500	0	0	0	0	63	0	728
Good Hope	0	[4] 15,000 [5] 23,000	0	14,000	0	3,000	[7] 5,000 [8] 80,000	0	0	0	140
Michigan	**0**	**60,300**	**0**	**6,800**	**28,000**	**0**	**1,100**	**0**	**0**	**0**	**95**
Carson City	0	0	0	0	0	0	0	0	0	0	0
Detroit	0	[3] 12,000 [4] 21,500 [5] 3,000	0	4,200	28,000	0	0	0	0	0	80
Alma	0	[4] 18,000 [5] 2,000 [9] 3,800	0	4,600	0	0	[8] 1,100	0	0	0	15
Minnesota	**0**	**221,000**	**0**	**14,000**	**69,000**	**0**	**23,300**	**0**	**20**	**15,000**	**534**
St. Paul	0	[3] 23,000 [4] 32,800 [5] 7,200	0	5,500	14,000	0	[8] 8,300	0	0	0	44
St. Paul	0	[3] 66,000 [4] 41,000 [5] 51,000	0	8,500	55,000	0	[8] 15,000	0	20	15,000	490
Mississippi	**60,000**	**254,000**	**0**	**20,700**	**41,700**	**5,500**	**0**	**5,000**	**217**	**17,700**	**1,260**
Purvis	0	[4] 6,000 [5] 6,000	0	4,500	0	0	0	0	0	1,700	40

[1] Delayed Coking [2] Low Pressure [3] Heavy Gas Oil [4] Naph./Ref. Feeds [5] Distillate [6] High Pressure
[7] C_4 [8] C_5 and C_6 [9] Other/Residual [10] Fluid Coking [11] Visbreaking [12] Other/Gas Oil

E = Estimated. MMcfd = Million cubic feet per day.
* Reported no inputs during 1988.
Source: Form EIA-820, "Annual Refinery Report."

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Reforming
	Operating	Idle	Operating	Idle			Fresh	Recycled	
Mississippi (Continued)									
Chevron U.S.A. Inc.									
Pascagoula	295,000	0	310,000	0	243,000	[1] 62,000	56,000	2,000	[2] 57,000 [6] 33,000
Ergon Refining Inc.									
Vicksburg	20,600	0	22,000	0	17,000	0	0	0	0
Petro Source Resources Inc.									
Vicksburg	6,000	0	7,900	0	7,900	0	0	0	0
Southland Oil Co.									
Lumberton	5,800	0	6,500	0	0	0	0	0	0
Sandersville	11,000	0	12,500	0	6,050	0	0	0	0
Montana	**130,650**	**7,800**	**135,200**	**8,000**	**53,350**	**7,700**	**52,170**	**6,620**	**35,530**
Cenex									
Laurel	33,650	7,800	34,500	8,000	12,000	0	13,500	1,500	[2] 12,000
Conoco Inc.									
Billings	48,500	0	50,000	0	20,000	0	15,500	1,000	[6] 12,500
Exxon Co. U.S.A.									
Billings	42,000	0	44,000	0	18,000	[10] 7,700	21,000	3,500	[6] 10,000
Montana Refining Co.									
Great Falls	6,500	0	6,700	0	3,350	0	2,170	620	[6] 1,030
Nevada	**4,500**	**0**	**4,700**	**0**	**2,500**	**0**	**0**	**0**	**0**
Nevada Refining Co.									
Tonopah	4,500	0	4,700	0	2,500	0	0	0	0
New Jersey	**400,000**	**0**	**434,000**	**0**	**244,100**	**21,500**	**251,000**	**37,000**	**77,500**
Amerada Hess Corp.									
Port Reading	0	0	0	0	0	0	50,000	0	0
Chevron U.S.A. Inc.									
Perth Amboy	80,000	0	85,000	0	46,000	0	0	0	0
Coastal Eagle Point Oil Co.									
Westville	90,000	0	110,000	0	35,000	0	45,000	12,000	[2] 26,000
Exxon Co. U.S.A.									
Linden	130,000	0	135,000	0	66,000	0	120,000	25,000	[2] 28,000
Mobil Oil Corp.									
Paulsboro	100,000	0	104,000	0	62,400	[1] 21,500	36,000	0	[6] 23,500
Seaview Petroleum Inc.									
Paulsboro	0	0	0	0	34,700	0	0	0	0

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

Location	Downstream Charge Capacity (Cont.)			Production Capacity							
	Catalytic Hydrocracking	Catalytic Hydrotreating	Fuels Solvent Deasphalting	Alkylates	Asphalt	Aromatics	Isomers	Lubricants	Hydrogen (MMcfd)	Marketable Petroleum Coke	Sulfur (short tons/day)
Mississippi(Continued)											
Pascagoula	68,000	[3] 63,000 [4] 48,000 [5] 30,000 [9] 96,000	0	16,200	20,000	5,500	0	0	215	16,000	1,220
Vicksburg	0	[9] 5,000	0	0	12,000	0	0	5,000	2	0	0
Vicksburg	0	0	0	0	0	0	0	0	0	0	0
Lumberton	0	0	0	0	3,575	0	0	0	0	0	0
Sandersville	0	0	0	0	6,125	0	0	0	0	0	0
Montana	**4,900**	**118,270**	**4,000**	**12,180**	**26,740**	**0**	**4,650**	**0**	**19**	**2,175**	**37**
Laurel	0	[4] 12,000 [5] 15,000	4,000	3,780	8,000	0	[7] 1,250	0	0	0	37
Billings	0	[5] 3,500 [9] 38,000	0	5,000	6,500	0	[7] 3,400	0	0	0	0
Billings	4,900	[4] 15,500 [5] 20,000 [9] 6,000	0	3,400	11,000	0	0	0	19	2,175	0
Great Falls	0	[4] 1,030 [5] 1,240	0	0	1,240	0	0	0	0	0	0
Nevada	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Tonopah	0	0	0	0	0	0	0	0	0	0	0
New Jersey	**17,000**	**284,500**	**0**	**24,500**	**94,850**	**3,500**	**25,000**	**8,500**	**16**	**5,050**	**3,592**
Port Reading	0	0	0	5,000	0	0	0	0	0	0	10
Perth Amboy	0	0	0	0	35,000	0	0	0	0	0	0
Westville	17,000	[4] 26,000 [5] 15,000	0	4,000	0	3,500	0	0	0	0	3,000
Linden	0	[3] 50,000 [4] 48,000 [5] 65,000	0	10,500	38,000	0	[8] 25,000	0	5	0	433
Paulsboro	0	[4] 23,500 [5] 42,000 [9] 15,000	0	5,000	0	0	0	8,500	11	5,050	149
Paulsboro	0	0	0	0	21,850	0	0	0	0	0	0

[1] Delayed Coking [2] Low Pressure [3] Heavy Gas Oil [4] Naph./Ref. Feeds [5] Distillate [6] High Pressure
[7] C_4 [8] C_5 and C_6 [9] Other/Residual [10] Fluid Coking [11] Visbreaking [12] Other/Gas Oil

E = Estimated. MMcfd = Million cubic feet per day.
* Reported no inputs during 1988.
Source: Form EIA-820, "Annual Refinery Report."

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Reforming
	Operating	Idle	Operating	Idle			Fresh	Recycled	
New Mexico	**75,600**	**0**	**84,607**	**0**	**13,900**	**0**	**27,100**	**6,100**	**19,200**
Bloomfield Refining Co.									
Bloomfield	16,800	0	18,107	0	0	0	5,400	500	[5] 3,400
Giant Refining Co.									
Gallup	18,000	0	19,000	0	7,900	0	7,200	3,600	[5] 6,800
Navajo Refining Co.									
Artesia	34,700	0	40,000	0	6,000	0	14,500	2,000	[5] 8,000
Thriftway Co.									
Bloomfield	6,100	0	7,500	0	0	0	0	0	[2] 1,000
New York	**41,850**	**0**	**45,000**	**0**	**27,000**	**0**	**0**	**0**	**0**
Cibro Petroleum Products Inc.									
Albany	41,850	0	45,000	0	27,000	0	0	0	0
North Carolina	**3,000**	**10,000**	**3,500**	**12,000**	**0**	**0**	**0**	**0**	**0**
City Gas & Transmission Corp. [4]									
Wilmington	0	10,000	0	12,000	0	0	0	0	0
GNC Energy Corp.									
Greensboro	3,000	0	3,500	0	0	0	0	0	0
North Dakota	**58,000**	**0**	**60,000**	**0**	**0**	**0**	**26,000**	**5,200**	**12,100**
Amoco Oil Co.									
Mandan	58,000	0	60,000	0	0	0	26,000	5,200	[6] 12,100
Ohio	**484,600**	**0**	**507,000**	**0**	**185,000**	**30,700**	**176,000**	**17,500**	**161,600**
Ashland Oil Inc.									
Canton	66,000	0	68,000	0	33,000	0	25,000	0	[2] 20,000
BP Oil Corp.									
(Formerly Standard Oil Co.)									
Lima	167,500	0	180,000	0	54,000	[1] 17,000	36,000	0	[5] 54,000
Toledo	126,100	0	130,000	0	68,000	[1] 13,700	55,000	16,500	[5] 42,000
Sun Co Inc.									
Toledo	125,000	0	129,000	0	30,000	0	60,000	1,000	[5] 45,600
Oklahoma	**381,500**	**0**	**399,200**	**0**	**142,000**	**27,000**	**132,500**	**6,400**	**91,100**
Barrett Refining Corp.									
Thomas	10,000	0	11,200	0	0	0	0	0	0
Conoco Inc.									
Ponca City	136,000	0	140,000	0	40,000	[1] 20,500	46,000	0	[5] 34,500
Kerr-McGee Refining Corp.									
Wynnewood	43,000	0	45,000	0	14,000	0	18,000	0	[5] 8,600
Sinclair Oil Corp.									
Tulsa	47,000	0	50,000	0	27,000	0	18,000	5,000	[5] 12,000
Sun Co Inc.									
Tulsa	85,000	0	90,000	0	29,000	[1] 6,500	28,000	1,400	[5] 24,000
Total Petroleum Inc.									
Ardmore	60,500	0	63,000	0	32,000	0	22,500	0	[2] 12,000

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

Location	Downstream Charge Capacity (Cont.)			Production Capacity							
	Catalytic Hydro-cracking	Catalytic Hydro-treating	Fuels Solvent Deasphalting	Alkylates	Asphalt	Aromatics	Isomers	Lubricants	Hydrogen (MMcfd)	Marketable Petroleum Coke	Sulfur (short tons/ day)
New Mexico	**0**	**29,200**	**0**	**3,200**	**4,100**	**0**	**4,000**	**0**	**0**	**0**	**0**
Bloomfield	0	[4] 3,400	0	0	0	0	0	0	0	0	0
Gallup	0	[4] 6,800	0	1,400	700	0	[8] 4,000	0	0	0	0
Artesia	0	[4] 10,000 [5] 9,000	0	1,800	3,400	0	0	0	0	0	0
Bloomfield	0	0	0	0	0	0	0	0	0	0	0
New York	**0**	**0**	**0**	**0**	**13,000**	**0**	**0**	**0**	**0**	**0**	**0**
Albany	0	0	0	0	13,000	0	0	0	0	0	0
North Carolina	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Wilmington	0	0	0	0	0	0	0	0	0	0	0
Greensboro	0	0	0	0	0	0	0	0	0	0	0
North Dakota	**0**	**16,600**	**0**	**3,400**	**0**	**0**	**4,000**	**0**	**0**	**0**	**17**
Mandan	0	[4] 16,600	0	3,400	0	0	[8] 4,000	0	0	0	17
Ohio	**87,200**	**194,500**	**9,000**	**25,800**	**14,500**	**16,000**	**10,693**	**3,000**	**65**	**6,190**	**245**
Canton	0	[3] 23,000 [4] 26,500 [5] 7,000	0	7,000	12,000	0	[8] 6,500	0	0	0	55
Lima	24,000	[4] 58,000	0	0	0	7,000	[7] 4,193	3,000	0	3,000	45
Toledo	35,000	[4] 40,000	0	11,000	0	0	0	0	24	3,190	100
Toledo	28,200	[4] 40,000	9,000	7,800	2,500	9,000	0	0	41	0	45
Oklahoma	**4,500**	**158,000**	**10,000**	**34,000**	**18,800**	**2,200**	**20,400**	**9,725**	**10**	**4,925**	**40**
Thomas	0	0	0	0	0	0	0	0	0	0	0
Ponca City	0	[4] 34,500 [5] 24,000	0	12,000	0	0	[7] 4,500	2,225	0	3,700	0
Wynnewood	4,500	[4] 10,500	4,200	5,000	5,000	0	[8] 4,000	0	10	0	0
Tulsa	0	[4] 12,000 [5] 5,000	0	3,000	3,200	0	[8] 8,000	0	0	0	20
Tulsa	0	[4] 24,000 [9] 10,000	5,800	7,000	4,600	2,200	[7] 2,800	7,500	0	1,225	0
Ardmore	0	[3] 20,000 [4] 18,000	0	7,000	6,000	0	[8] 1,100	0	0	0	20

[1] Delayed Coking [2] Low Pressure [3] Heavy Gas Oil [4] Naph./Ref. Feeds [5] Distillate [6] High Pressure
[7] C_4 [8] C_5 and C_6 [9] Other/Residual [10] Fluid Coking [11] Visbreaking [12] Other/Gas Oil

E = Estimated. MMcfd = Million cubic feet per day.
* Reported no inputs during 1988.
Source: Form EIA-820, "Annual Refinery Report."

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Reforming
	Operating	Idle	Operating	Idle			Fresh	Recycled	
Oregon	**0**	**0**	**0**	**0**	**16,000**	**0**	**0**	**0**	**0**
Chevron U.S.A. Inc.									
Willbridge	0	0	0	0	16,000	0	0	0	0
Pennsylvania	**734,315**	**0**	**770,500**	**0**	**319,300**	**0**	**238,300**	**6,800**	**208,400**
Atlantic Refining & Marketing Corp.									
Philadelphia	125,000	0	130,000	0	83,000	0	29,000	0	[6] 60,000
BP Oil Corp.									
Marcus Hook	172,000	0	180,000	0	75,000	0	50,000	1,600	[2] 48,000
Chevron U.S.A. Inc.									
Philadelphia	175,000	0	180,000	0	80,000	0	53,300	5,000	[6] 34,000
Pennzoil Products Co.									
Rouseville	15,700	0	15,500	0	6,500	0	0	0	[2] 5,820
Quaker State Oil Refining Corp.									
Smethport	6,700	0	7,000	0	2,800	0	0	0	[2] 1,280
Sun Co Inc.									
Marcus Hook	170,000	0	185,000	0	46,000	0	86,000	0	[6] 41,300
United Refining Co.									
Warren	60,000	0	62,000	0	26,000	0	20,000	200	[6] 16,000
Witco Corp.									
Bradford	9,915	0	10,000	0	0	0	0	0	[6] 2,000
Tennessee	**58,000**	**0**	**60,000**	**0**	**12,000**	**0**	**30,000**	**0**	**10,000**
Mapco Petroleum Inc.									
Memphis	58,000	0	60,000	0	12,000	0	30,000	0	[2] 10,000
Texas	**3,896,950**	**182,050**	**4,133,500**	**192,800**	**1,777,700**	**373,800**	**1,583,500**	**128,300**	**1,143,500**
Amoco Oil Co.									
Texas City	420,000	0	440,000	0	200,000	[1] 41,000	195,000	43,000	[2] 63,000 [6] 97,000
Champlin Refining Co.									
Corpus Christi	130,000	0	140,000	0	75,000	[1] 29,000	68,000	2,800	[2] 52,200
Chevron U.S.A. Inc.									
El Paso	66,000	0	68,000	0	54,000	0	22,000	0	[2] 25,000
Port Arthur	329,000	0	338,000	0	163,200	[1] 34,000	110,000	6,000	[2] 44,100 [6] 23,000

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

Location	Downstream Charge Capacity (Cont.)			Production Capacity							
	Catalytic Hydrocracking	Catalytic Hydrotreating	Fuels Solvent Deasphalting	Alkylates	Asphalt	Aromatics	Isomers	Lubricants	Hydrogen (MMcfd)	Marketable Petroleum Coke	Sulfur (short tons/day)
Oregon	**0**	**0**	**0**	**0**	**11,500**	**0**	**0**	**0**	**0**	**0**	**0**
Willbridge	0	0	0	0	11,500	0	0	0	0	0	0
Pennsylvania	**51,000**	**479,620**	**16,000**	**47,000**	**33,000**	**12,300**	**11,950**	**20,200**	**56**	**0**	**440**
Philadelphia	30,000	[3] 24,000 [4] 54,000 [5] 50,000	0	0	25,000	0	0	0	45	0	203
Marcus Hook	21,000	[3] 50,000 [4] 56,000 [5] 44,000	0	12,000	0	0	[7] 4,000	0	0	0	172
Philadelphia	0	[4] 34,000 [5] 30,000	16,000	20,000	0	5,300	0	0	0	0	45
Rouseville	0	[4] 6,500 [9] 7,800	0	0	0	0	[8] 1,150	4,750	4	0	0
Smethport	0	[4] 2,520	0	0	0	0	0	2,450	0	0	0
Marcus Hook	0	[4] 57,500 [5] 28,800 [9] 6,000	0	12,000	0	7,000	0	10,000	7	0	0
Warren	0	[4] 20,000 [5] 6,000	0	3,000	8,000	0	[8] 6,800	0	0	0	20
Bradford	0	[4] 2,500	0	0	0	0	0	3,000	0	0	0
Tennessee	**0**	**35,000**	**0**	**2,500**	**0**	**0**	**0**	**0**	**0**	**0**	**45**
Memphis	0	[4] 15,000 [5] 16,000 [9] 4,000	0	2,500	0	0	0	0	0	0	45
Texas	**296,000**	**3,103,150**	**99,500**	**269,000**	**67,025**	**178,875**	**132,660**	**89,400**	**699**	**52,650**	**6,742**
Texas City	115,500	[3] 82,000 [4] 126,000 [5] 70,000	0	50,000	0	45,000	[8] 27,000	0	180	15,000	1,400
Corpus Christi	0	[3] 52,000 [4] 61,000 [5] 37,000	0	19,000	0	5,400	0	0	65	1,780	230
El Paso	0	[4] 25,000 [5] 18,000	0	5,500	5,500	0	[7] 3,000	0	0	0	47
Port Arthur	0	[3] 40,000 [4] 67,100 [5] 98,000 [9] 13,900	0	16,900	0	12,500	[8] 7,200	10,000	0	9,200	532

[1] Delayed Coking [2] Low Pressure [3] Heavy Gas Oil [4] Naph./Ref. Feeds [5] Distillate [6] High Pressure
[7] C_4 [8] C_5 and C_6 [9] Other/Residual [10] Fluid Coking [11] Visbreaking [12] Other/Gas Oil

E = Estimated. MMcfd = Million cubic feet per day.
* Reported no inputs during 1988.
Source: Form EIA-820, "Annual Refinery Report."

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Reforming
	Operating	Idle	Operating	Idle			Fresh	Recycled	
Texas (Continued)									
Coastal Refining & Marketing Inc.									
Corpus Christi	90,000	0	95,000	0	45,000	[11] 11,000 [1] 12,000	18,500	0	[6] 28,500
Crown Central Petroleum Corp.									
Pasadena	100,000	0	103,000	0	38,000	[1] 12,500	56,000	0	[2] 23,000 [6] 13,000
Diamond Shamrock Refining & Marketing Co.									
Sunray	105,000	0	107,000	0	45,000	0	45,000	0	[2] 30,000
Three Rivers	51,000	0	53,000	0	20,000	0	20,500	0	[2] 10,500
Donna Refinery Partners Ltd.									
Donna	E 4,750	0	E 5,000	0	0	0	0	0	0
El Paso Refining Co. Ltd.									
El Paso	25,500	0	27,000	0	0	[1] 4,000	7,000	1,000	[6] 6,000
Exxon Co. U.S.A.									
Baytown	426,000	67,000	448,000	69,000	258,000	[12] 28,000	155,000	15,000	[2] 123,000
Fina Oil & Chemical Co.									
Big Springs	55,000	0	60,000	0	25,000	[11] 3,500	23,000	0	[2] 20,000
Port Arthur	110,000	0	115,000	0	50,000	0	36,000	0	[2] 35,000
Hill Petroleum Co.									
Houston	65,000	0	71,000	0	30,000	0	55,000	0	[6] 13,500
Hill Petroleum Co. (Formerly Texas City Refining Inc.)									
Texas City	119,600	0	130,000	0	54,000	[11] 19,000	43,500	0	[2] 12,000 [6] 11,000
Howell Hydrocarbons Corp.									
San Antonio	1,500	3,000	2,000	3,000	0	0	0	0	[6] 1,200
Koch Refining Co.									
Corpus Christi	125,000	0	130,000	0	42,000	[1] 12,000	42,500	800	[2] 48,000
La Gloria Oil & Gas Co.									
Tyler	46,000	0	49,500	0	14,000	[1] 9,300	18,000	800	[2] 12,000 [6] 4,600
Leal Petroleum Corp.									
Nixon	15,900	5,000	17,100	7,500	0	0	0	0	0
Lyondell Petrochemical Co.									
Houston	265,000	0	314,000	0	127,000	[1] 45,000	85,000	0	[2] 25,000 [6] 83,000
Marathon Petroleum Co.									
Texas City	69,500	0	74,000	0	27,000	0	37,000	0	[6] 10,500
Mobil Oil Corp.									
Beaumont	275,000	0	290,000	0	86,000	[1] 29,500	102,000	0	[2] 46,000 [6] 57,000

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

Location	Downstream Charge Capacity (Cont.)			Production Capacity							
	Catalytic Hydrocracking	Catalytic Hydrotreating	Fuels Solvent Deasphalting	Alkylates	Asphalt	Aromatics	Isomers	Lubricants	Hydrogen (MMcfd)	Marketable Petroleum Coke	Sulfur (short tons/day)
Texas (Continued)											
Corpus Christi	11,000	[3] 25,000 [4] 32,000 [5] 24,000	0	3,000	5,000	11,000	[8] 5,200	0	24	3,250	85
Pasadena	0	[4] 28,000 [5] 7,000	0	10,000	0	2,000	0	0	0	1,500	16
Sunray	20,000	[4] 35,000	15,000	10,000	6,000	0	0	0	0	0	45
Three Rivers	0	[4] 11,000	7,000	6,000	500	0	0	1,000	0	0	0
Donna	0	0	0	0	0	0	0	0	0	0	0
El Paso	0	[4] 6,000	0	2,400	0	0	[7] 700	0	0	300	0
Baytown	19,000	[3] 95,000 [4] 162,500 [5] 223,000 [9] 44,100	35,000	29,000	7,000	0	0	31,200	85	500	1,238
Big Springs	0	[3] 6,000 [4] 25,000 [5] 11,000	10,000	6,000	5,500	0	0	0	0	0	50
Port Arthur	18,500	[4] 40,000 [5] 32,000 [9] 15,000	18,000	4,500	2,000	9,500	[8] 8,000	0	0	0	170
Houston	0	[4] 16,000 [5] 30,000	10,500	5,500	5,000	2,500	0	0	0	0	200
Texas City	0	[4] 23,000 [5] 29,000	0	6,200	0	0	0	0	0	0	27
San Antonio	0	0	0	0	0	1,200	0	0	0	0	0
Corpus Christi	0	[4] 54,000 [5] 9,000	0	8,400	0	12,450	0	0	0	2,000	50
Tyler	0	[4] 20,000 [5] 7,500	0	4,700	0	0	[7] 500 [8] 4,000	0	17	1,200	11
Nixon	0	[4] 9,500 [5] 8,000 [9] 1,000	0	0	0	0	[7] 1,000 [8] 1,000	0	0	0	0
Houston	0	[3] 82,000 [4] 132,000 [5] 93,000 [9] 6,600	0	0	0	36,000	0	6,600	0	10,900	392
Texas City	0	0	0	10,000	0	2,500	0	0	0	0	0
Beaumont	32,000	[4] 92,000 [5] 116,000 [9] 5,650	0	13,000	0	0	[8] 20,000	9,400	60	7,020	110

[1] Delayed Coking [2] Low Pressure [3] Heavy Gas Oil [4] Naph./Ref. Feeds [5] Distillate [6] High Pressure
[7] C_4 [8] C_5 and C_6 [9] Other/Residual [10] Fluid Coking [11] Visbreaking [12] Other/Gas Oil

E = Estimated. MMcfd = Million cubic feet per day.
* Reported no inputs during 1988.
Source: Form EIA-820, "Annual Refinery Report."

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Reforming
	Operating	Idle	Operating	Idle			Fresh	Recycled	
Texas (Continued)									
Petrolite Corp.									
Kilgore	1,000	0	1,400	0	400	0	0	0	0
Phillips 66 Co.									
Borger	105,000	0	110,000	0	0	0	60,000	10,400	[6] 26,000
Sweeny	175,000	0	195,000	0	83,000	0	87,000	12,000	[6] 36,000
Pride Refining Inc.									
Abilene	28,500	14,250	30,000	15,000	12,500	0	0	0	0
Shell Oil Co.									
Deer Park	215,900	0	227,000	0	89,500	[11] 55,000 [12] 19,000	65,000	5,000	[2] 43,000 [6] 20,000
Odessa	28,600	0	29,500	0	10,000	0	10,500	0	[6] 11,000
South Hampton Refining Co.									
Silsbee	0	0	0	0	0	0	0	0	[2] 400
Southwestern Refining Co. Inc.									
Corpus Christi	104,000	0	108,000	0	36,000	0	52,000	0	[6] 30,000
Star Enterprise									
(Formerly Texaco Refining & Marketing Inc.)									
Port Arthur/Port Neches	250,000	0	278,000	0	143,100	0	110,000	31,500	[2] 40,000
Trifinery*									
Corpus Christi	0	27,000	0	29,000	15,000	[11] 10,000	0	0	0
Unocal Corp.									
Nederland	74,200	45,800	78,000	48,300	13,000	0	0	0	[2] 20,000
Valero Refining Co.									
Corpus Christi	0	20,000	0	21,000	22,000	0	60,000	0	0
Utah	**154,500**	**0**	**160,000**	**0**	**45,500**	**8,500**	**49,400**	**9,600**	**28,550**
Amoco Oil Co.									
Salt Lake City	40,000	0	41,500	0	0	0	18,000	4,000	[6] 7,650
Big West Oil Co.									
North Salt Lake	24,000	0	25,000	0	3,800	0	5,000	1,500	[6] 5,000
Chevron U.S.A. Inc.									
Salt Lake City	45,000	0	46,000	0	35,500	[1] 8,500	18,000	1,000	[6] 5,500
Crysen Refining Inc.									
Woods Cross	12,500	0	13,000	0	3,000	0	0	0	[2] 2,400
Pennzoil Products Co.									
Roosevelt	8,000	0	8,500	0	0	0	0	500	[6] 2,000
Phillips 66 Co.									
Woods Cross	25,000	0	26,000	0	3,200	0	8,400	2,600	[6] 6,000

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

Location	Downstream Charge Capacity (Cont.)			Production Capacity							
	Catalytic Hydrocracking	Catalytic Hydrotreating	Fuels Solvent Deasphalting	Alkylates	Asphalt	Aromatics	Isomers	Lubricants	Hydrogen (MMcfd)	Marketable Petroleum Coke	Sulfur (short tons/day)
Texas (Continued)											
Kilgore	0	0	0	0	125	0	0	0	0	0	0
Borger	0	[4] 26,500 [5] 40,000 [9] 50,000	0	14,000	0	0	[7] 11,000 [8] 24,600	0	50	0	381
Sweeny	0	[4] 53,000 [5] 50,000 [9] 75,000	0	10,500	0	5,575	[8] 16,900	0	80	0	420
Abilene	0	0	0	0	0	0	0	0	0	0	0
Deer Park	65,000	[3] 45,000 [4] 64,000 [5] 77,000 [9] 49,000	4,000	8,100	5,900	20,000	0	10,700	65	0	577
Odessa	0	[4] 11,000	0	3,300	0	350	0	0	0	0	0
Silsbee	0	[4] 1,700 [5] 500 [9] 500	0	0	0	400	[8] 560	0	1	0	0
Corpus Christi	0	[3] 18,000 [4] 40,000 [5] 27,000	0	4,500	0	6,500	0	0	0	0	129
Port Arthur/Port Neches	15,000	[4] 40,000 [5] 80,000 [9] 18,500	0	9,000	14,000	0	0	17,400	0	0	262
Corpus Christi	0	0	0	0	8,000	0	0	0	0	0	0
Nederland	0	[4] 30,600	0	0	2,500	6,000	0	3,100	0	0	0
Corpus Christi	0	[9] 60,000	0	9,500	0	0	[8] 2,000	0	72	0	370
Utah	**0**	**39,250**	**5,000**	**11,400**	**3,200**	**0**	**6,350**	**0**	**0**	**1,750**	**13**
Salt Lake City	0	[4] 7,650	0	4,000	0	0	[7] 1,400	0	0	0	0
North Salt Lake	0	[4] 6,000	0	1,000	0	0	[7] 600 [8] 1,000	0	0	0	0
Salt Lake City	0	[4] 5,500 [5] 5,500	0	4,300	0	0	[7] 750	0	0	1,750	13
Woods Cross	0	0	0	0	1,500	0	0	0	0	0	0
Roosevelt	0	[4] 2,000	0	0	0	0	0	0	0	0	0
Woods Cross	0	[4] 11,000 [5] 1,600	5,000	2,100	1,700	0	[8] 2,600	0	0	0	0

[1] Delayed Coking [2] Low Pressure [3] Heavy Gas Oil [4] Naph./Ref. Feeds [5] Distillate [6] High Pressure
[7] C_4 [8] C_5 and C_6 [9] Other/Residual [10] Fluid Coking [11] Visbreaking [12] Other/Gas Oil

E = Estimated. MMcfd = Million cubic feet per day.
* Reported no inputs during 1988.
Source: Form EIA-820, "Annual Refinery Report."

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Reforming
	Operating	Idle	Operating	Idle			Fresh	Recycled	
Virginia	**54,700**	**0**	**57,000**	**0**	**29,000**	**13,500**	**27,000**	**2,000**	**9,750**
Amoco Oil Co.									
Yorktown	51,000	0	53,000	0	29,000	[1] 13,500	27,000	2,000	[2] 9,750
Primary Oil & Energy Corp.									
Chester	3,700	0	4,000	0	0	0	0	0	0
Washington	**453,400**	**11,900**	**471,000**	**12,754**	**219,000**	**70,000**	**102,500**	**13,000**	**121,800**
Arco Products Co.									
Ferndale	163,000	0	170,000	0	95,000	[1] 50,000	0	0	[2] 58,000
BP Oil Corp.									
(Formerly Mobil Oil Corp.)									
Ferndale	77,400	0	79,000	0	28,000	0	25,500	2,000	[2] 11,800
Chevron U.S.A. Inc.									
Richmond Beach	0	0	0	0	6,000	0	0	0	0
Shell Oil Co.									
Anacortes	84,000	0	88,000	0	36,000	0	41,000	7,000	[2] 25,000
Sound Refining Inc.									
Tacoma	0	11,900	0	12,754	6,000	0	0	0	0
Texaco Refining & Marketing Inc.									
Anacortes	97,000	0	100,000	0	30,000	[1] 20,000	36,000	4,000	[6] 21,000
U.S. Oil & Refining Co.									
Tacoma	32,000	0	34,000	0	18,000	0	0	0	[6] 6,000
West Virginia	**16,808**	**0**	**17,500**	**0**	**8,175**	**0**	**0**	**0**	**5,300**
Mid Atlantic Fuels Inc.									
St. Mary's	4,658	0	5,000	0	2,175	0	0	0	[6] 1,600
Quaker State Oil Refining Corp.									
Newell	12,150	0	12,500	0	6,000	0	0	0	[2] 3,700
Wisconsin	**32,000**	**0**	**34,000**	**0**	**20,500**	**0**	**12,600**	**1,000**	**8,000**
Murphy Oil U.S.A. Inc.									
Superior	32,000	0	34,000	0	20,500	0	12,600	1,000	[2] 8,000
Wyoming	**169,725**	**0**	**175,750**	**0**	**75,000**	**9,000**	**62,000**	**12,200**	**32,250**
Amoco Oil Co.									
Casper	40,000	0	41,000	0	16,000	0	13,500	2,700	[6] 7,000
Frontier Refining Co.									
Cheyenne	38,670	0	40,750	0	17,000	[1] 9,000	12,000	500	[2] 6,500
Little America Refining Co.									
Evansville	24,500	0	25,500	0	12,000	0	10,500	5,000	[6] 6,000
Sinclair Oil Corp.									
Sinclair	54,000	0	55,000	0	30,000	0	21,000	1,000	[6] 10,000

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

Location	Downstream Charge Capacity (Cont.)			Production Capacity							
	Catalytic Hydrocracking	Catalytic Hydrotreating	Fuels Solvent Deasphalting	Alkylates	Asphalt	Aromatics	Isomers	Lubricants	Hydrogen (MMcfd)	Marketable Petroleum Coke	Sulfur (short tons/day)
Virginia	**0**	**25,250**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5,100**	**73**
Yorktown	0	[4] 9,750 [5] 15,500	0	0	0	0	0	0	0	5,100	73
Chester	0	0	0	0	0	0	0	0	0	0	0
Washington	**52,000**	**204,300**	**20,000**	**24,800**	**16,000**	**0**	**2,750**	**0**	**80**	**17,500**	**278**
Ferndale	52,000	[4] 38,000 [5] 18,000	0	0	0	0	0	0	80	12,500	180
Ferndale	0	[4] 13,500 [5] 15,000	0	5,900	0	0	0	0	0	0	21
Richmond Beach	0	0	0	0	5,000	0	0	0	0	0	0
Anacortes	0	[3] 7,500 [4] 32,000 [5] 20,500	15,500	10,900	0	0	[7] 2,750	0	0	0	0
Tacoma	0	0	0	0	3,000	0	0	0	0	0	0
Anacortes	0	[4] 22,000 [5] 13,000 [9] 15,000	4,500	8,000	0	0	0	0	0	5,000	70
Tacoma	0	[3] 3,800 [4] 6,000	0	0	8,000	0	0	0	0	0	7
West Virginia	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6,212**	**1**	**0**	**0**
St. Mary's	0	0	0	0	0	0	0	1,156	0	0	0
Newell	0	0	0	0	0	0	0	5,056	1	0	0
Wisconsin	**0**	**14,800**	**0**	**1,500**	**13,500**	**0**	**0**	**0**	**0**	**0**	**14**
Superior	0	[4] 9,000 [5] 5,800	0	1,600	13,500	0	0	0	0	0	14
Wyoming	**0**	**48,900**	**0**	**9,650**	**16,950**	**0**	**3,500**	**1,600**	**0**	**1,450**	**42**
Casper	0	[4] 7,100	0	2,500	550	0	0	1,600	0	0	0
Cheyenne	0	[4] 7,500 [5] 4,500	0	2,750	7,000	0	[7] 1,500	0	0	450	24
Evansville	0	[5] 3,700	0	0	4,400	0	0	0	0	0	0
Sinclair	0	[4] 14,000 [5] 12,000	0	3,500	5,000	0	[7] 2,000	0	0	1,000	18

[1] Delayed Coking [2] Low Pressure [3] Heavy Gas Oil [4] Naph./Ref. Feeds [5] Distillate [6] High Pressure
[7] C_4 [8] C_5 and C_6 [9] Other/Residual [10] Fluid Coking [11] Visbreaking [12] Other/Gas Oil

E = Estimated. MMcfd = Million cubic feet per day.
* Reported no inputs during 1988.
Source: Form EIA-820, "Annual Refinery Report."

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

State/Refiner/Location	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
	Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Reforming
	Operating	Idle	Operating	Idle			Fresh	Recycled	
Wyoming (Continued)									
Wyoming Refining Co.									
Newcastle	12,555	0	13,500	0	0	0	5,000	3,000	[6] 2,750
U.S. Total	**15,011,824**	**643,050**	**15,850,309**	**717,674**	**7,225,225**	**2,072,900**	**5,324,320**	**325,845**	**3,910,880**
Puerto Rico	**85,000**	**0**	**87,000**	**0**	**45,000**	**0**	**0**	**0**	**72,800**
Phillips Puerto Rico Core Inc.									
Guayama	0	0	0	0	0	0	0	0	[2] 38,400 [5] 14,400
Sun Co Inc.									
Yabucoa	85,000	0	87,000	0	45,000	0	0	0	[2] 20,000
Virgin Islands	**470,000**	**75,000**	**510,000**	**85,000**	**215,000**	**85,000**	**0**	**0**	**115,000**
Amerada Hess Corp.									
St. Croix	470,000	75,000	510,000	85,000	215,000	[11] 85,000	0	0	[2] 90,000 [5] 25,000

Table 31. Capacity of Operable Petroleum Refineries by State as of January 1, 1989 (Continued)
(Barrels per Stream Day, Except Where Noted)

Location	Downstream Charge Capacity (Cont.)			Production Capacity							
	Catalytic Hydrocracking	Catalytic Hydrotreating	Fuels Solvent Deasphalting	Alkylates	Asphalt	Aromatics	Isomers	Lubricants	Hydrogen (MMcfd)	Marketable Petroleum Coke	Sulfur (short tons/day)
Wyoming (Continued)											
Newcastle	0	0	0	900	0	0	0	0	0	0	0
U.S. Total	**1,237,690**	**9,439,895**	**244,500**	**1,015,030**	**822,788**	**289,547**	**468,723**	**229,662**	**2,501**	**332,671**	**28,369**
Puerto Rico	**15,600**	**80,000**	**0**	**0**	**0**	**15,000**	**0**	**9,500**	**19**	**0**	**68**
Guayama	0	[4] 50,000	0	0	0	15,000	0	0	0	0	0
Yabucoa	15,600	[3] 10,000 [4] 20,000	0	0	0	0	0	9,500	19	0	68
Virgin Islands	**0**	**420,000**	**0**	**0**	**0**	**35,000**	**18,000**	**0**	**0**	**0**	**580**
St. Croix	0	[3] 130,000 [4] 125,000 [5] 165,000	0	0	0	35,000	[8] 18,000	0	0	0	580

[1] Delayed Coking [2] Low Pressure [3] Heavy Gas Oil [4] Naph./Ref. Feeds [5] Distillate [6] High Pressure
[7] C_4 [8] C_5 and C_6 [9] Other/Residual [10] Fluid Coking [11] Visbreaking [12] Other/Gas Oil

E = Estimated. MMcfd = Million cubic feet per day.
* Reported no inputs during 1988.
Source: Form EIA-820, "Annual Refinery Report."

Table 32. Refiners' Operable Atmospheric Crude Oil Distillation Capacity as of January 1, 1989

Refiner	Barrels per Calendar Day
Companies with Capacity Over 100,000 B/CD	
Chevron U.S.A. Inc.	**1,660,000**
El Segundo, California	330,000
Port Arthur, Texas	329,000
Pascagoula, Mississippi	295,000
Richmond, California	270,000
Philadelphia, Pennsylvania	175,000
Perth Amboy, New Jersey	80,000
El Paso, Texas	66,000
Honolulu, Hawaii	48,000
Salt Lake City, Utah	45,000
Kenai, Alaska	22,000
Exxon Co. U.S.A.	**1,248,000**
Baytown, Texas	493,000
Baton Rouge, Louisiana	455,000
Linden, New Jersey	130,000
Benicia, California	128,000
Billings, Montana	42,000
Shell Oil Co.	**1,082,600**
Wood River, Illinois	274,000
Deer Park, Texas	215,900
Norco, Louisiana	215,000
Martinez, California	140,100
Carson, California	125,000
Anacortes, Washington	84,000
Odessa, Texas	28,600
Amoco Oil Co.	**987,000**
Texas City, Texas	420,000
Whiting, Indiana	350,000
Mandan, North Dakota	58,000
Yorktown, Virginia	51,000
Salt Lake City, Utah	40,000
Casper, Wyoming	40,000
Savannah, Georgia	28,000
Mobil Oil Corp.	**823,000**
Beaumont, Texas	275,000
Joliet, Illinois	180,000
Chalmette, Louisiana [1]	145,000
Torrance, California	123,000
Paulsboro, New Jersey	100,000
BP America Inc.	**756,640**
BP Oil Corp.	
Belle Chasse, Louisiana [2]	213,640
Marcus Hook, Pennsylvania	172,000
Lima, Ohio [2]	167,500
Toledo, Ohio [2]	126,100
Ferndale, Washington [3]	77,400
Atlantic Richfield Co.	**686,000**
Arco Products Co.	
Los Angeles, California	214,000
Ferndale, Washington	163,000
Lyondell Petrochemical Co.	
Houston, Texas	285,000
Arco Alaska Inc.	
Anchorage, Alaska	12,000
Prudhoe Bay, Alaska	12,000
Star Enterprise [4]	**615,000**
Port Arthur/Port Neches, Texas	250,000
Convent, Louisiana	225,000
Delaware City, Delaware	140,000
U.S. Steel Corp.	**553,000**
Marathon Petroleum Co.	
Garyville, Louisiana	255,000
Robinson, Illinois	160,000
Texas City, Texas	69,500
Detroit, Michigan	68,500
Unocal Corp.	**487,900**
Lemont, Illinois	147,000
Nederland, Texas	120,000
Wilmington, California	108,000
Rodeo, California	71,900
Arroyo Grande, California	41,000
E I Du Pont De Nemours & Co.	**397,300**
Conoco Inc.	
Westlake, Louisiana	156,500
Ponca City, Oklahoma	136,000
Billings, Montana	48,500
Commerce City, Colorado	44,000
Santa Maria, California	9,500
Egan, Louisiana	2,800
Sun Co Inc.	**380,000**
Marcus Hook, Pennsylvania	170,000
Toledo, Ohio	125,000
Tulsa, Oklahoma	85,000
Ashland Oil Inc.	**346,500**
Catlettsburg, Kentucky	213,400
St. Paul, Minnesota	67,100
Canton, Ohio	66,000
Citgo Petroleum Corp./Petroleos De Venezuela	
Citgo Petroleum Corp.	
Lake Charles, Louisiana	**305,000**
Koch Industries Inc.	**305,000**
Koch Refining Co.	
St. Paul, Minnesota	180,000
Corpus Christi, Texas	125,000
Phillips 66 Co.	**305,000**
Sweeny, Texas	175,000
Borger, Texas	105,000
Woods Cross, Utah	25,000
Trans America Refining Co.	
Good Hope, Louisiana	**300,000**
Texaco Refining & Marketing Inc.	**279,000**
Anacortes, Washington	97,000
El Dorado, Kansas	78,000
Wilmington, California	57,000
Bakersfield, California	47,000
Solomon Inc.	**276,100**
Hill Petroleum Co.	
Texas City, Texas [5]	119,600
Houston, Texas	65,000
Krotz Springs, Louisiana	57,500
St.Rose, Louisiana	34,000

See footnotes at end of table.

Table 32. Refiners' Operable Atmospheric Crude Oil Distillation Capacity as of January 1, 1989 (Continued)

Refiner	Barrels per Calendar Day
Coastal Corp., The	**265,800**
Coastal Eagle Point Oil Co.	
Westville, New Jersey	90,000
Coastal Refining & Marketing Inc.	
Corpus Christi, Texas	90,000
Derby Refining Co.	
El Dorado, Kansas	30,400
Wichita, Kansas	28,800
Belcher Refining Co.	
Chickasaw, Alabama	26,600
Total Petroleum Inc.	**184,100**
Ardmore, Oklahoma	60,500
Arkansas City, Kansas	53,600
Alma, Michigan	42,000
Colorado Refining Co.	
Commerce City, Colorado	28,000
Fina Oil & Chemical Co.	**165,000**
Port Arthur, Texas	110,000
Big Springs, Texas	55,000
Diamond Shamrock Refining & Marketing Co.	**156,000**
Sunray, Texas	105,000
Three Rivers, Texas	51,000
Kerr-McGee Corp.	**154,800**
Southwestern Refining Co. Inc.	
Corpus Christi, Texas	104,000
Kerr-McGee Refining Corp.	
Wynnewood, Oklahoma	43,000
Cotton Valley, Louisiana	7,800
Mapco Petroleum Inc.	**148,000**
North Pole, Alaska	90,000
Memphis, Tennessee	58,000
Petroleos De Venezuela	
Champlin Refining Co.	
Corpus Christi, Texas	**130,000**
Horsham Corp. [6]	**128,200**
Clark Oil & Refining Corp.	
Blue Island, Illinois	64,600
Hartford, Illinois	63,600
Tosco Corp.	
Martinez, California	**126,000**
Sinclair Oil Corp.	**125,500**
Sinclair, Wyoming	54,000
Tulsa, Oklahoma	47,000
Little America Refining Co.	
Evansville, Wyoming	24,500
Atlantic Refining & Marketing Corp.	
Philadelphia, Pennsylvania	**125,000**
Murphy Oil U.S.A. Inc.	**124,500**
Meraux, Louisiana	92,500
Superior, Wisconsin	32,000
Total	**13,625,940**

Refiner	Barrels per Calendar Day
Companies with Capacity 30,001 to 100,000 B/CD	
Crown Central Petroleum Corp.	
Pasadena, Texas	100,000
Farmland Industries Inc.	82,900
Coffeyville, Kansas	56,500
Phillipsburg, Kansas	26,400
LL&E Petroleum Marketing Inc.	
Saraland, Alabama	80,000
Pacific Resources Inc.	
Hawaiian Independent Refinery Inc.	
Ewa Beach, Hawaii	78,500
National Cooperative Refinery Association	
McPherson, Kansas	75,600
Tesoro Petroleum Corp.	
Kenai, Alaska	72,000
Pennzoil Products Co.	69,900
Shreveport, Louisiana	46,200
Rouseville, Pennsylvania	15,700
Roosevelt, Utah	8,000
United Refining Inc. [7]	69,500
United Refining Co.	
Warren, Pennsylvania	60,000
Vulcan Refining Co.	
Cordova, Alabama	9,500
American Ultramar Ltd.	
Ultramar Refining [8]	
Wilmington, California	65,000
Coastal Corp./Sinochem	
Pacific Refining Co.	
Hercules, California	55,000
Pauley Petroleum Inc.	52,000
Fletcher Oil & Refining Co.	
Carson, California	29,500
Newhall Refining Co. Inc.	
Newhall, California	22,500
Rock Island Refining Corp.	
Indianapolis, Indiana	49,000
Lion Oil Co.	
El Dorado, Arkansas	48,000
Paramount Acquisition Corp.	
Paramount Petroleum Corp.	
Paramount, California	46,500
Placid Oil Co.	
Placid Refining Co.	
Port Allen, Louisiana	46,000
Texas Eastern Corp.	
La Gloria Oil & Gas Co.	
Tyler, Texas	46,000

See footnotes at end of table.

Table 32. Refiners' Operable Atmospheric Crude Oil Distillation Capacity as of January 1, 1989 (Continued)

Refiner	Barrels per Calendar Day
Pride Refining Inc.	
Abilene, Texas	42,750
Thrifty Oil Co.	
Golden West Refining Co.	
Santa Fe Springs, California	42,000
Cirillo Brothers Oil Co.	
Cibro Petroleum Products Inc.	
Albany, New York	41,850
Sulfur Mountain Corp. [9]	
Edgington Oil Co.	
Long Beach, California	41,600
Cenex	
Laurel, Montana	41,450
Holly Corp.	41,200
Navajo Refining Co.	
Artesia, New Mexico	34,700
Montana Refining Co.	
Great Falls, Montana	6,500
Frontier Refining Co.	
Cheyenne, Wyoming	38,670
Sargent Holdings Ltd.	
Powerine Oil Co.	
Santa Fe Springs, California	35,000
Hunt Oil Co.	
Tuscaloosa, Alabama	33,500
Gary Energy Corp.	32,000
Bloomfield Refining Co.	
Bloomfield, New Mexico	16,800
Western Slope Refining Co. [10] *	
Fruita, Colorado	15,200
Time Oil Co.	
U.S. Oil & Refining Co.	
Tacoma, Washington	32,000
Total	**1,457,920**
Companies with Capacity 10,001 to 30,000 B/CD	
Amerada Hess Corp.	
Purvis, Mississippi	30,000
American International Petroleum Corp.	
American International Refinery Inc. [11] *	
Lake Charles, Louisiana	27,000
Petroserve Ltd.	
Trifinery	
Corpus Christi, Texas	27,000
El Paso Refining Co. Ltd.	
El Paso, Texas	25,500
Crysen Corp.	24,400
Crysen Refining Inc.	
Woods Cross, Utah	12,500
Sound Refining Inc.	
Tacoma, Washington	11,900
San Joaquin Refining Co. Inc.	
Bakersfield, California	24,300
Flying J Petroleum Inc.	
Big West Oil Co.	
North Salt Lake, Utah	24,000
Kern Oil & Refining Co.	
Bakersfield, California	21,400
Indiana Farm Bureau Cooperative Association	
Mount Vernon, Indiana	21,200
Leal Petroleum Corp.	
Nixon, Texas	20,900
Ergon Inc.	
Ergon Refining Inc.	
Vicksburg, Mississippi	20,600
Valero Refining Co.	
Corpus Christi, Texas	20,000
Quaker State Oil Refining Corp.	18,850
Newell, West Virginia	12,150
Smethport, Pennsylvania	6,700
Giant Refining Co.	
Gallup, New Mexico	18,000
VGS Corp.	16,800
Southland Oil Co.	
Sandersville, Mississippi	11,000
Lumberton, Mississippi	5,800
Chemoil Refining Corp. [12]	
Long Beach, California	14,200
Huntway Refining Co.	14,100
Benicia, California	8,600
Wilmington, California	5,500
Calcasieu Refining Co.	
Lake Charles, Louisiana	13,500
Wyoming Refining Co.	
Newcastle, Wyoming	12,555
World Oil Co.	
Sunland Refining Corp.	
Bakersfield, California	12,000
Total	**406,305**

See footnotes at end of table.

Table 32. Refiners' Operable Atmospheric Crude Oil Distillation Capacity as of January 1, 1989 (Continued)

Refiner	Barrels per Calendar Day
Companies with Capacity 10,000 B/CD or Less	
Barrett Refining Corp. Thomas, Oklahoma	10,000
City Gas & Transmission Corp. Wilmington, North Carolina	10,000
Endevco Inc. [13] Dubach, Louisiana	10,000
Witco Corp. Bradford, Pennsylvania	9,915
Gibson Oil & Refining Co. Inc. Bakersfield, California	9,600
Asphalt Materials [14] Laketon Refining Corp. Laketon, Indiana	8,700
Lunday Thagard Co. South Gate, California	8,100
Anchor Gasoline Corp. Canal Refining Co. Church Point, Louisiana	8,000
Claiborne Gasoline Co. Lisbon, Louisiana	7,500
Petro Star North Pole, Alaska	7,000
Moore & Munger Marketing & Refining Inc. Cross Oil & Refining Co. of Arkansas Smackover, Arkansas	6,700
Thriftway Co. Bloomfield, New Mexico	6,100
Transcontinental Energy Corp. Petro Source Resources Inc. Vicksburg, Mississippi	6,000
Somerset Refinery Inc. Somerset, Kentucky	5,500
Young Refining Corp. Douglasville, Georgia	5,079
Donna Refinery Partners Ltd. Donna, Texas	4,750
Mid Atlantic Fuels Inc. St. Mary's, West Virginia	4,658
Howell Hydrocarbons Corp. San Antonio, Texas	4,500
Nevada Refining Co. Tonopah, Nevada	4,500
Calumet Refining Co. Princeton, Louisiana	4,207
Oil Holding Inc. Tenby Inc. [15] Oxnard, California	4,000
Warrior Asphalt Refining Corp. Holt, Alabama	4,000
Martin Gas Sales Inc. Berry Petroleum Co. Stephens, Arkansas	3,700
Primary Oil & Energy Corp. Chester, Virginia	3,700
B-T Energy Corp. GNC Energy Corp. Greensboro, North Carolina	3,000
Crystal Refining Co. Carson City, Michigan	3,000
Kentucky Oil & Refining Co. Troy, Indiana	1,500
Petrolite Corp. Kilgore, Texas	1,000
Total	164,709
U.S. Total	15,654,874

[1] Formerly Tenneco Oil Co.
[2] Formerly Standard Oil Co.
[3] Formerly Mobil Oil Corp.
[4] Formerly Texaco Refining & Marketing Inc.
[5] Formerly Texas City Refining Inc.
[6] Formerly Apex Oil Co.
[7] Formerly Coral Petroleum Co.
[8] Formerly Union Pacific Resources Co.
[9] Formerly Triad Terminal Corp.
[10] Formerly Gary Energy Corp.
[11] Formerly Lake Charles Refining Co.
[12] Formerly Macmillan Petroleum Co.
[13] Formerly Kerr-McGee Refining Corp.
[14] Formerly Young Refining Corp.
[15] Formerly Oxnard Refinery
* Refinery was reactivated January 1, 1989.
Source: Form EIA-820, "Annual Refinery Report."

Table 33. Operable Crude and Downstream Charge Capacity of Petroleum Refineries, January 1, 1981 to January 1, 1990
(Thousand Barrels per Stream Day, Except Where Noted)

Year/PAD District	Atmospheric Crude Oil Distillation	Downstream Charge Capacity							
		Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Reforming	Catalytic Hydrocracking	Catalytic Hydrotreating	Fuels Solvent Deasphalting
				Fresh	Recycled				
Jan 1, 1981	19,763	7,033	1,587	5,543	594	4,098	909	8,487	NA
Jan 1, 1982	19,018	7,197	1,782	5,474	562	3,966	892	8,539	NA
Jan 1, 1983	17,871	7,180	1,715	5,402	488	3,918	883	8,354	NA
Jan 1, 1984	17,059	7,165	1,852	5,310	492	3,907	952	9,009	NA
Jan 1, 1985	16,504	6,998	1,858	5,232	507	3,750	1,053	8,897	NA
Jan 1, 1986	16,346	6,892	1,880	5,214	463	3,744	1,125	8,791	NA
Jan 1, 1987	16,460	6,935	1,928	5,251	466	3,805	1,189	9,083	230
Jan 1, 1988	16,825	7,198	2,080	5,424	381	3,891	1,202	9,170	240
Jan 1, 1989	**16,568**	**7,225**	**2,073**	**5,324**	**326**	**3,911**	**1,238**	**9,440**	**245**
PADD I	1,525	723	81	581	51	357	87	902	16
PADD II	3,428	1,364	376	1,235	59	914	162	1,920	40
PADD III	7,814	3,284	1,002	2,548	156	1,818	513	4,710	110
PADD IV	571	207	29	187	29	116	10	236	9
PADD V	3,231	1,649	585	773	30	706	465	1,671	70
Jan 1, 1990	**16,638**	**7,255**	**2,073**	**5,346**	**325**	**3,919**	**1,254**	**9,456**	**282**
PADD I	1,525	735	81	581	51	357	87	902	16
PADD II	3,434	1,364	376	1,236	59	914	162	1,925	40
PADD III	7,864	3,297	1,002	2,568	156	1,826	526	4,721	148
PADD IV	571	207	29	187	29	116	10	236	9
PADD V	3,245	1,652	585	774	30	706	469	1,671	70
1989-1990	**70**	**30**	**0**	**21**	**-1**	**8**	**16**	**16**	**38**
(Net Change)									
PADD I	0	13	0	0	0	0	0	0	0
PADD II	6	0	0	1	0	0	0	6	(s)
PADD III	51	14	0	20	-1	8	13	11	38
PADD IV	0	0	0	0	0	(s)	0	0	0
PADD V	14	3	0	(s)	0	0	4	0	0

NA = Not Available.
(s) = Less than 500 barrels per stream day.
Note: Totals may not equal sum of components due to independent rounding.
Source: Form EIA-820, "Annual Refinery Report."

Table 34. Operable Production Capacity of Petroleum Refineries, January 1, 1981 to January 1, 1990
(Thousand Barrels per Stream Day, Except Where Noted)

Year/PAD District	Production Capacity							
	Alkylates	Asphalt	Aromatics	Isomers	Lubricants	Hydrogen (MMcfd)	Marketable Petroleum Coke	Sulfur (short tons/ day)
Jan 1, 1981	974	765	299	131	234	2,054	276	NA
Jan 1, 1982	984	740	290	162	242	1,944	267	NA
Jan 1, 1983	960	722	237	212	241	2,298	296	NA
Jan 1, 1984	945	800	218	208	241	2,444	407	NA
Jan 1, 1985	917	767	215	219	243	2,572	424	NA
Jan 1, 1986	941	804	276	258	246	2,357	356	NA
Jan 1, 1987	974	788	287	326	250	2,569	364	23,806
Jan 1, 1988	993	788	289	465	232	2,418	368	27,639
Jan 1, 1989	**1,015**	**823**	**290**	**469**	**230**	**2,501**	**333**	**28,369**
PADD I	80	165	19	37	35	113	21	4,455
PADD II	260	264	54	140	32	154	70	3,429
PADD III	495	214	213	255	135	1,108	133	11,250
PADD IV	34	51	0	16	2	25	5	128
PADD V	146	130	3	21	27	1,101	103	9,107
Jan 1, 1990	**1,029**	**824**	**292**	**473**	**230**	**2,531**	**333**	**28,532**
PADD I	80	165	19	37	35	114	21	4,455
PADD II	260	264	55	144	32	182	70	3,429
PADD III	504	214	214	255	135	1,109	133	11,413
PADD IV	34	51	0	16	2	25	5	128
PADD V	151	131	3	21	27	1,101	103	9,107
1989-1990	**14**	**2**	**3**	**4**	**1**	**30**	**(s)**	**163**
(Net Change)								
PADD I	0	0	0	0	0	1	0	0
PADD II	0	0	1	4	1	28	0	0
PADD III	9	0	1	(s)	0	1	(s)	163
PADD IV	0	0	0	0	0	0	0	0
PADD V	5	2	0	0	0	0	0	0

NA = Not Available. MMcfd = Million cubic feet per day.
(s) = Less than 500 barrels per stream day.
Note: Totals may not equal sum of components due to independent rounding.
Source: Form EIA-820, "Annual Refinery Report."

Table 35. Working Storage Capacity [1] at Refineries and Gasoline Blending Plants by PAD District and State as of January 1, 1989
(Thousand Barrels)

District and State	Crude Oil	Products						
		Motor Gasoline			Gasoline Blending Components	Middle Distillates	Residual Fuel Oil	Asphalt and Road Oil
		Finished Leaded	Finished Unleaded	Total				
PAD District I	**23,508**	**2,874**	**13,839**	**16,713**	**9,819**	**23,748**	**12,845**	**4,752**
New Jersey	8,119	1,360	7,513	8,893	4,463	11,871	6,682	1,824
Pennsylvania	9,907	842	2,988	3,830	3,122	3,784	2,165	1,096
Other States [3]	5,482	652	3,338	3,990	2,234	8,093	3,998	1,832
PAD District II	**24,740**	**9,001**	**16,726**	**25,727**	**15,968**	**23,654**	**5,776**	**11,194**
Illinois	6,854	2,300	4,144	6,444	4,650	6,392	1,693	1,932
Indiana	2,536	632	2,279	2,911	2,479	3,033	1,336	1,423
Kansas	2,849	2,074	2,665	4,739	1,563	3,069	540	952
Ohio	3,377	435	1,761	2,196	2,407	1,678	325	840
Oklahoma	3,503	1,670	2,223	3,893	2,255	3,291	312	1,476
Other States [3]	5,621	1,890	3,654	5,544	2,614	6,191	1,570	4,571
PAD District III	**82,708**	**8,243**	**29,939**	**38,182**	**31,460**	**40,860**	**18,602**	**6,462**
Alabama	1,901	221	405	626	478	907	666	567
Arkansas	1,525	104	149	253	138	652	86	644
Louisiana	24,060	1,516	6,458	7,974	9,243	13,864	6,254	1,485
Mississippi	5,203	447	2,392	2,839	1,912	2,897	613	963
New Mexico	847	200	192	392	660	532	350	419
Texas	49,172	5,755	20,343	26,098	19,029	22,008	10,633	2,384
PAD District IV	**4,228**	**2,024**	**2,246**	**4,270**	**4,539**	**4,409**	**1,469**	**4,232**
Colorado	731	324	366	690	566	583	217	576
Montana	1,104	700	494	1,194	1,508	1,201	233	1,743
Utah	1,330	356	612	968	1,022	1,047	200	447
Wyoming	1,063	644	774	1,418	1,443	1,578	819	1,466
PAD District V	**39,177**	**3,710**	**10,562**	**14,272**	**15,492**	**11,501**	**12,920**	**3,826**
Alaska	1,037	82	241	323	277	809	1,124	89
California	27,004	2,524	8,647	11,171	12,735	7,993	9,109	2,828
Washington	7,330	1,054	1,519	2,573	1,832	2,143	1,318	339
Other States [3]	3,806	50	155	205	648	556	1,369	570
U.S. Total	**174,361**	**25,852**	**73,312**	**99,164**	**77,278**	**104,172**	**51,612**	**30,466**

See footnotes at end of table.

Table 35. Working Storage Capacity [1] at Refineries and Gasoline Blending Plants by PAD District and State as of January 1, 1989 (Continued)

(Thousand Barrels)

District and State	Products							Total Crude Oil and Products
				Jet Fuel		All Other Products [2]	Total Products	
	Lubricants	Propane	Butane	Naphtha-type	Kerosene-type			
PAD District I	**2,911**	**2,062**	**1,506**	**594**	**4,658**	**15,161**	**94,769**	**118,277**
New Jersey	467	313	420	0	2,998	8,419	46,350	54,469
Pennsylvania	2,056	1,033	976	206	1,326	5,410	25,004	34,911
Other States [3]	388	716	110	388	334	1,332	23,415	28,897
PAD District II	**2,736**	**5,747**	**3,268**	**1,255**	**5,866**	**33,564**	**134,755**	**159,495**
Illinois	942	734	799	44	1,712	10,579	35,921	42,775
Indiana	585	347	721	404	1,161	4,722	19,122	21,658
Kansas	0	2,670	388	0	434	4,463	18,818	21,667
Ohio	256	481	471	97	554	3,481	12,786	16,163
Oklahoma	782	260	298	545	1,045	5,883	20,040	23,543
Other States [3]	171	1,255	591	165	960	4,436	28,068	33,689
PAD District III	**10,291**	**5,781**	**10,862**	**2,766**	**13,129**	**110,039**	**288,434**	**371,142**
Alabama	0	3	21	134	405	377	4,184	6,085
Arkansas	126	2	6	19	25	3	1,954	3,479
Louisiana	3,179	1,300	5,724	755	3,958	24,139	77,875	101,935
Mississippi	429	69	118	71	1,254	4,918	16,083	21,286
New Mexico	0	8	23	384	114	957	3,839	4,686
Texas	6,557	4,399	4,970	1,403	7,373	79,645	184,499	233,671
PAD District IV	**257**	**168**	**373**	**604**	**743**	**3,519**	**24,583**	**28,811**
Colorado	0	7	16	224	187	580	3,646	4,377
Montana	0	20	188	81	279	1,322	7,769	8,873
Utah	0	130	49	173	176	1,085	5,297	6,627
Wyoming	257	11	120	126	101	532	7,871	8,934
PAD District V	**2,508**	**384**	**1,717**	**1,500**	**6,286**	**36,335**	**106,741**	**145,918**
Alaska	0	5	19	175	479	244	3,544	4,581
California	2,508	328	1,335	970	4,089	31,164	84,230	111,234
Washington	0	32	314	137	1,220	4,344	14,252	21,582
Other States [3]	0	19	49	218	498	583	4,715	8,521
U.S. Total	**18,703**	**14,142**	**17,726**	**6,719**	**30,682**	**198,618**	**649,282**	[4] 823,643

[1] Working Storage Capacity - the difference in volume between the maximum safe fill capacity and tank bottoms.

[2] All Other Products includes ethane, isobutane, pentanes plus, other hydrocarbons, hydrogen, alcohol, unfinished oils, finished aviation gasoline, special naphthas, wax, petroleum coke, still gas, petrochemical feedstocks and miscellaneous products.

[3] Other States include PAD District I: Connecticut, Delaware, Florida, Georgia, Maryland, New York, North Carolina, Virginia, West Virginia
PAD District II: Kentucky, Michigan, Minnesota, Missouri, North Dakota, Tennessee, Wisconsin
PAD District V: Hawaii, Nevada, Oregon.

[4] Includes 24,921 thousand barrels storage capacity at shutdown refineries and 40,464 thousand barrels storage capacity at gasoline blending plants.

Source: Form EIA-820, "Annual Refinery Report."

Table 36. Shell Storage Capacity [1] at Refineries and Gasoline Blending Plants by PAD District and State as of January 1, 1989
(Thousand Barrels)

District and State	Crude Oil	Products						
		Motor Gasoline			Gasoline Blending Components	Middle Distillates	Residual Fuel Oil	Asphalt and Road Oil
		Finished Leaded	Finished Unleaded	Total				
PAD District I	**27,135**	**3,166**	**15,295**	**18,461**	**11,304**	**25,708**	**13,860**	**5,278**
New Jersey	9,420	1,504	8,268	9,772	5,259	12,891	7,284	2,082
Pennsylvania	11,291	960	3,429	4,389	3,580	4,239	2,414	1,259
Other States [3]	6,424	702	3,598	4,300	2,465	8,578	4,162	1,937
PAD District II	**27,903**	**10,062**	**19,050**	**29,112**	**18,1[illegible]**	**25,602**	**6,309**	**12,155**
Illinois	7,863	2,723	4,855	7,578	5,36[illegible]	6,915	1,820	2,060
Indiana	2,943	691	2,617	3,308	2,92[illegible]	3,409	1,459	1,636
Kansas	3,102	2,189	2,963	5,152	1,7[illegible]	3,259	593	1,040
Ohio	3,789	518	2,106	2,624	2,[illegible]	1,855	423	903
Oklahoma	4,043	1,892	2,466	4,358	2,392	3,605	344	1,642
Other States [3]	6,163	2,049	4,043	6,092	2,864	6,559	1,670	4,874
PAD District III	**98,335**	**9,399**	**34,444**	**43,843**	**36,568**	**45,992**	**21,096**	**7,461**
Alabama	2,291	256	482	738	518	1,050	791	694
Arkansas	1,688	116	166	282	148	704	97	711
Louisiana	29,987	1,795	7,825	9,620	11,445	16,031	7,063	1,749
Mississippi	5,873	493	2,560	3,053	2,015	3,112	666	1,118
New Mexico	962	238	238	476	720	629	419	425
Texas	57,534	6,501	23,173	29,674	21,722	24,466	12,060	2,764
PAD District IV	**4,645**	**2,245**	**2,501**	**4,746**	**5,016**	**4,699**	**1,552**	**4,461**
Colorado	788	353	401	754	619	612	237	593
Montana	1,286	788	561	1,349	1,700	1,300	255	1,909
Utah	1,462	408	719	1,127	1,150	1,123	216	456
Wyoming	1,109	696	820	1,516	1,547	1,664	844	1,503
PAD District V	**46,190**	**4,459**	**12,240**	**16,699**	**18,027**	**12,766**	**14,236**	**4,201**
Alaska	1,103	86	255	341	291	847	1,173	92
California	32,632	3,155	10,120	13,275	14,949	8,984	10,189	3,159
Washington	8,318	1,163	1,697	2,860	2,096	2,342	1,436	351
Other States [3]	4,137	55	168	223	691	593	1,438	599
U.S. Total	**204,208**	**29,331**	**83,530**	**112,861**	**89,075**	**114,767**	**57,053**	**33,556**

See footnotes at end of table.

Table 36. Shell Storage Capacity [1] at Refineries and Gasoline Blending Plants by PAD District and State as of January 1, 1989 (Continued)
(Thousand Barrels)

District and State	Products							Total Crude Oil and Products
				Jet Fuel		All Other Products [2]	Total Products	
	Lubricants	Propane	Butane	Naphtha-type	Kerosene-type			
PAD District I	**2,985**	**2,370**	**1,697**	**646**	**5,006**	**17,726**	**105,041**	**132,176**
New Jersey	488	363	511	0	3,202	9,530	51,382	60,802
Pennsylvania	2,089	1,186	1,062	236	1,452	6,005	27,911	39,202
Other States [3]	408	821	124	410	352	2,191	25,748	32,172
PAD District II	**2,939**	**6,085**	**3,582**	**1,425**	**6,421**	**37,718**	**149,508**	**177,411**
Illinois	974	816	839	50	1,877	12,394	40,690	48,553
Indiana	647	357	742	473	1,293	5,256	21,504	24,447
Kansas	0	2,674	499	0	453	4,851	20,243	23,345
Ohio	269	494	507	120	607	3,919	14,612	18,401
Oklahoma	869	295	324	601	1,168	6,610	22,208	26,251
Other States [3]	180	1,449	671	181	1,023	4,688	30,251	36,414
PAD District III	**11,589**	**6,697**	**11,948**	**3,174**	**14,985**	**125,913**	**329,266**	**427,601**
Alabama	0	4	24	161	497	452	4,929	7,220
Arkansas	138	2	7	20	30	3	2,142	3,830
Louisiana	3,627	1,316	6,029	845	4,528	28,678	90,931	120,918
Mississippi	504	73	119	76	1,355	5,337	17,428	23,301
New Mexico	0	9	25	436	124	1,113	4,376	5,338
Texas	7,320	5,293	5,744	1,636	8,451	90,330	209,460	266,994
PAD District IV	**285**	**184**	**399**	**671**	**844**	**3,819**	**26,676**	**31,321**
Colorado	0	7	17	237	237	634	3,947	4,735
Montana	0	22	201	97	306	1,403	8,542	9,828
Utah	0	143	59	203	193	1,201	5,871	7,333
Wyoming	285	12	122	134	108	581	8,316	9,425
PAD District V	**2,624**	**417**	**1,885**	**1,655**	**7,093**	**41,831**	**121,434**	**167,624**
Alaska	0	5	20	183	505	256	3,713	4,816
California	2,624	355	1,476	1,105	4,713	35,905	96,734	129,366
Washington	0	33	330	141	1,352	5,043	15,984	24,302
Other States [3]	0	24	59	226	523	627	5,003	9,140
U.S. Total	**20,422**	**15,753**	**19,511**	**7,571**	**34,349**	**227,007**	**731,925**	**[4] 936,133**

[1] Shell Storage Capacity - the design capacity of the tank.

[2] All Other Products includes ethane, isobutane, pentanes plus, other hydrocarbons, hydrogen, alcohol, unfinished oils, finished aviation gasoline, special naphthas, wax, petroleum coke, still gas, petrochemical feedstocks and miscellaneous products.

[3] Other States Include PAD District I: Connecticut, Delaware, Florida, Georgia, Maryland, New York, North Carolina, Virginia, West Virginia
PAD District II: Kentucky, Michigan, Minnesota, Missouri, North Dakota, Tennessee, Wisconsin
PAD District V: Hawaii, Nevada, Oregon.

[4] Includes 27,805 thousand barrels storage capacity at shutdown refineries and 42,657 thousand barrels storage capacity at gasoline blending plants.

Source: Form EIA-820, "Annual Refinery Report."

Table 37. Refinery Receipts of Crude Oil by Method of Transportation by PAD District, 1988
(Thousand Barrels)

Method	PAD Districts					United States
	I	II	III	IV	V	
Pipeline						
Domestic	4,021	722,105	949,179	126,240	343,535	2,145,080
Foreign	20,727	335,935	258,635	24,528	3,519	643,344
Tanker						
Domestic	25,451	0	110,606	0	515,664	651,721
Foreign	392,399	0	796,904	0	70,232	1,259,535
Barge						
Domestic	2,119	1,216	116,427	0	6,319	126,081
Foreign	20,345	58	8,117	0	2,598	31,118
Tank Cars						
Domestic	6,609	0	306	0	15,322	22,237
Foreign	0	0	0	0	0	0
Trucks						
Domestic	4,224	7,817	33,792	14,291	7,983	68,107
Foreign	0	0	0	0	0	0
Total						
Domestic	42,424	731,138	1,210,310	140,531	888,823	3,013,226
Foreign	433,471	335,993	1,063,656	24,528	76,349	1,933,997

Source: Form EIA-820, "Annual Refinery Report."

Table 38. Fuels Consumed at Refineries by PAD District, 1988
(Thousand Barrels, Except Where Noted)

Commodity	PAD Districts					United States
	I	II	III	IV	V	
Crude Oil	0	0	8	0	5	13
Distillate Fuel Oil	83	167	20	4	509	783
Residual Fuel Oil	4,356	4,571	1,386	899	2,089	13,301
Liquefied Petroleum Gases	929	2,246	824	513	4,954	9,466
Natural Gas (million cubic feet)	23,299	66,958	426,877	8,203	80,392	605,729
Still Gas	21,024	49,375	110,298	6,961	49,483	237,141
Marketable Petroleum Coke	0	0	0	141	1,063	1,204
Catalyst Petroleum Coke	11,586	16,810	35,369	2,251	12,281	78,297
Coal (thousand short tons)	171	21	0	0	0	192
Purchased Electricity (million kWh)	3,375	7,629	12,346	1,154	10,462	34,966
Purchased Steam (million pounds)	4,342	906	16,036	0	8,516	29,800
Hydrogen (million cubic feet)	0	0	0	0	0	0
Unfinished Oils	49	574	33	0	804	1,460
Other [1]	6	79	61	0	124	270

[1] Other includes special naphthas, asphalt and road oil, finished motor gasoline, wax, gasoline blending components, lubricants and kerosene.
Source: Form EIA-820, "Annual Refinery Report."

Table 39. Reactivated and Shutdown Refineries During 1988

PAD District/Refinery	Location	Total Atmospheric Crude Oil Distillation Capacity B/CD	Total Downstream Charge Capacity B/SD	Date of Last Operation	Date Operable	Date Shutdown
REACTIVATED						
PAD District III		**27,000**	**21,600**	--	--	--
American International Refining Inc.	Lake Charles, LA.	27,000	21,600	4/81	1/89	--
PAD District IV		**15,200**	**27,100**			
Western Slope Refining Co.	Fruita, CO.	15,200	27,100	1/85	1/89	--
Total Reactivated		**42,200**	**48,700**	--	--	--
SHUTDOWN						
PAD District I		**17,000**	**11,390**	--	--	--
Seminole Refining Corp.	St. Marks, FL.	17,000	11,390	5/87	--	3/88
PAD District II		**2,100**	**1,200**	--	--	--
Kentucky Oil & Refining	Betsy Layne, KY.	600	0	2/81	--	11/88
Motor Oils Refining	McCook, IL.	1,500	1,200	1/88	--	2/88
PAD District III		**78,700**	**47,700**	--	--	--
Amber Refining Inc.	Fort Worth, TX.	19,700	17,700	12/85	--	12/88
GAMXX Energy Inc.	Theodore, AL.	27,000	10,000	1/88	--	3/88
Liquid Energy Corp.	Bridgeport, TX.	10,000	0	2/87	--	10/88
OGC Corp.	Egan, LA.	5,000	0	9/87	--	10/88
Texas NAPCO Inc.	St. James, LA.	17,000	20,000	8/83	--	12/88
PAD District IV		**5,950**	**7,700**	--	--	--
Flying J. Petroleum Inc.	Cutbank, MT.	5,600	7,700	3/83	--	2/88
Mountaineer Refining Co., Inc.	LaBarge, WY.	350	0	12/87	--	6/88
PAD District V		**5,000**	**0**	--	--	--
West Coast Oil Co.	Oildale, CA.	5,000	0	10/85	--	10/88
Total U.S. Shutdown		**108,750**	**67,990**	--	--	--
Puerto Rico		**36,000**	**57,800**	--	--	--
Caribbean Gulf Refining Corp.	San Juan, PR.	36,000	57,800	3/88	--	12/88
Guam		**43,900**	**1,400**	--	--	--
Guam Oil & Refining Co., Inc.	Agana, Guam	43,900	1,400	12/79	--	12/88

B/CD = Barrels per calendar day.
B/SD = Barrels per stream day.
Source: Form EIA-820, "Annual Refinery Report."

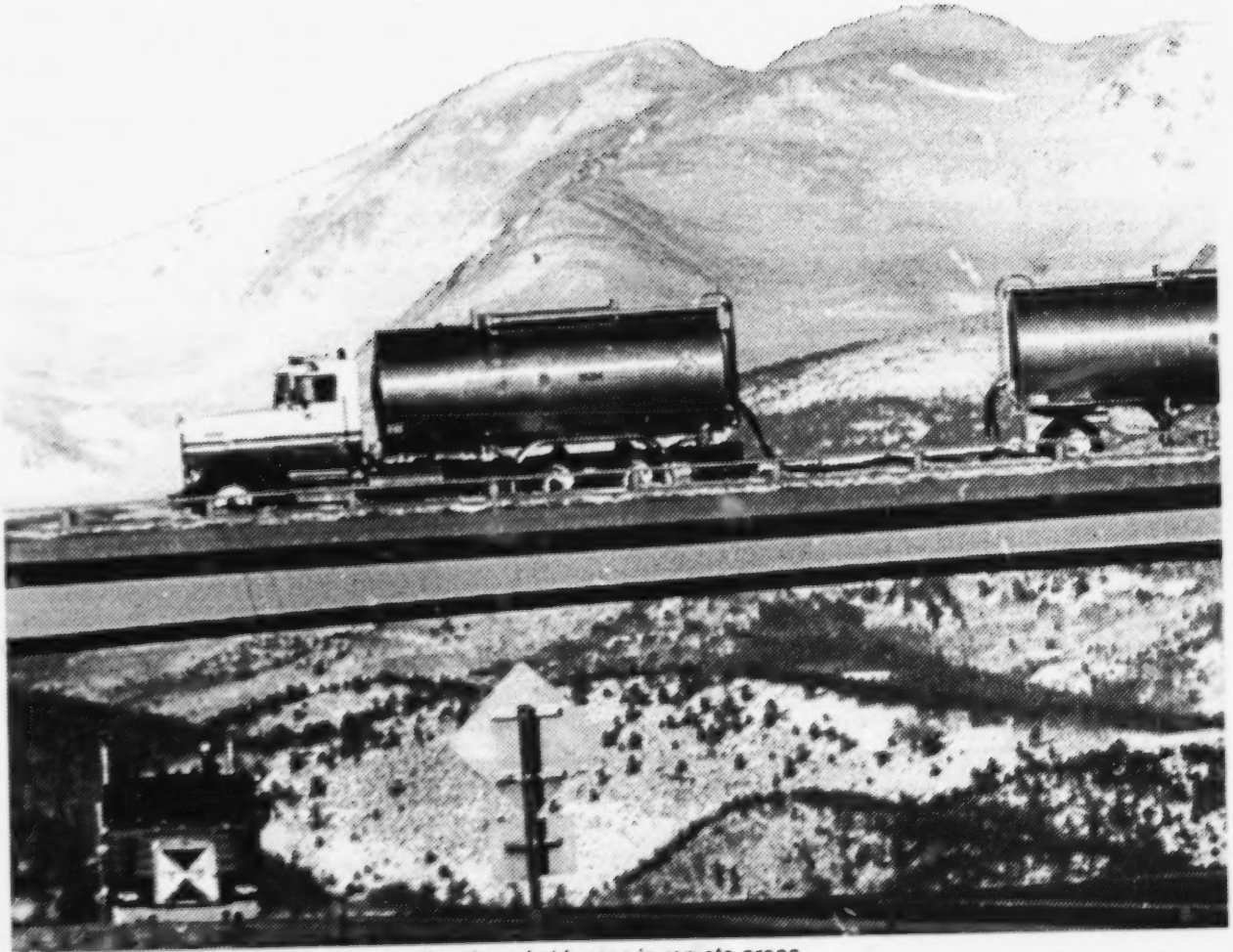
Table 40. Refinery Sales During 1988

Former Owner	Total Atmospheric Crude Oil Distillation Capacity B/CD	New Owner	Date of Sale
Agway Petroleum Corp.		Solomon, Inc.	
Texas City Refg. Inc.		Hill Petroleum Co.	9/88
Texas City, Texas	119,600		
Apex Oil Co.		Horsham Corp.	11/88
Clark Oil & Refg. Corp.			
Blue Island, Illinois	64,600		
Hartford, Illinois	63,600		
Aweco, Inc.		American International	
Lake Charles Refg. Co.		Refining Inc.	7/88
Lake Charles, Louisiana	27,000		
Coastal Corp.		Coastal Corp. (50%)	
Pacific Refining Co.		Sinochem (50%)	12/88
Hercules, California	55,000		
Coral Petroleum Co.		United Refg. Inc.	9/88
United Refg. Co.			
Warren, Pennsylvania	60,000		
Edgington Oil Co. Inc.		Sulfur Mountain Corp.	6/88
Long Beach, California	41,600		
Fletcher Oil & Refg. Co.		Pauley Petroleum Inc.	3/88
Carson, California	29,500		
Guam Oil & Refg. Co., Inc.		Shell Oil Corp.	11/88
Agana, Guam	43,900		
Kerr-McGee		Endevco, Inc.	11/88
Dubach, Louisiana	10,000		
Macmillan Petroleum Co.		Chemoil Corp.	
Signal Hill, California	14,200	Chemoil Refg. Corp.	8/88
Mobil Oil Corp.		BP America Inc.	12/88
Ferndale, Washington	77,400		
Paramount Petroleum Corp.		Paramount Acquisition Corp.	12/88
Paramount, California	46,500		
Tenneco Oil Co.		Mobil Oil Corp.	12/88
Chalmette, Louisiana	145,000		
Texaco, Inc.		Star Enterprise:	
Texaco Refg. & Mktg.		Saudi Refg. Inc. (50%)	
Delaware City, Delaware	140,000	Texaco, Inc. (50%)	11/88
Port Arthur, Texas	250,000		
Convent, Louisiana	225,000		
Union Pacific Resources Co.		Ultramar Refg.	12/88
Wilmington, California	65,000		
Union Pacific Corp. (50%)		Petroleos De Venezuela (100%)	12/88
Petroleos De Venezuela (50%)			
Champlin Petroleum Co.			
Corpus Christi, Texas	130,000		
Williams Companies		Coastal Corp.	
Augusta Refg. Co.		Derby Refg. Co.	7/88
Augusta, Kansas	0		
Young Refg. Corp.		Asphalt Materials	2/88
Laketon Refg. Corp.			
Laketon, Indiana	8,700		

B/CD = Barrels per calendar day.
Source: Form EIA-820, "Annual Refinery Report."

Appendix A

District Descriptions and Maps



Tank trucks are used to pick up crude oil gathered at leases in remote areas.

Appendix A

District Descriptions and Maps

The following are the Refining Districts which make up the Petroleum Administration for Defense (PAD) Districts.

PAD District I

East Coast: District of Columbia and the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida, and the following counties of the State of New York: Cayuga, Tompkins, Chemung, and all counties east and north thereof. Also the following counties in the State of Pennsylvania: Bradford, Sullivan, Columbia, Montour, Northumberland, Dauphin, York, and all counties east thereof.

Appalachian No. 1: The State of West Virginia and those parts of the States of Pennsylvania and New York not included in the East Coast District.

Sub-PAD District I

New England: The States of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont.

Central Atlantic: The District of Columbia and the States of Delaware, Maryland, New Jersey, New York, and Pennsylvania.

Lower Atlantic: The States of Florida, Georgia, North Carolina, South Carolina, Virginia and West Virginia.

PAD District II

Indiana-Illinois-Kentucky: The States of Indiana, Illinois, Kentucky, Tennessee, Michigan, and Ohio.

Minnesota-Wisconsin-North and South Dakota: The States of Minnesota, Wisconsin, North Dakota, and South Dakota.

Oklahoma-Kansas-Missouri: The States of Oklahoma, Kansas, Missouri, Nebraska, and Iowa.

PAD District III

Texas Inland: The State of Texas except the Texas Gulf Coast District.

Texas Gulf Coast: The following counties of the State of Texas: Newton, Orange, Jefferson, Jasper, Tyler, Hardin, Liberty, Chambers, Polk, San Jacinto, Montgomery, Harris, Galveston, Waller, Fort Bend, Brazoria, Wharton, Matagorda, Jackson, Victoria, Calhoun, Refugio, Aransas, San Patricio, Nueces, Kleberg, Kenedy, Willacy, and Cameron.

Louisiana Gulf Coast: The following Parishes of the State of Louisiana: Vernon, Rapides, Avoyelles, Pointe Coupee, West Feliciana, East Feliciana, Saint Helena, Tangipahoa, Washington, and all Parishes south thereof. Also the following counties of the State of Mississippi: Pearl River, Stone, George, Hancock, Harrison, and Jackson. Also the following counties of the State of Alabama: Mobile and Baldwin.

North Louisiana-Arkansas: The State of Arkansas and those parts of the States of Louisiana, Mississippi, and Alabama not included in the Louisiana Gulf Coast District.

New Mexico: The State of New Mexico.

PAD District IV

Rocky Mountain: The States of Montana, Idaho, Wyoming, Utah, and Colorado.

PAD District V

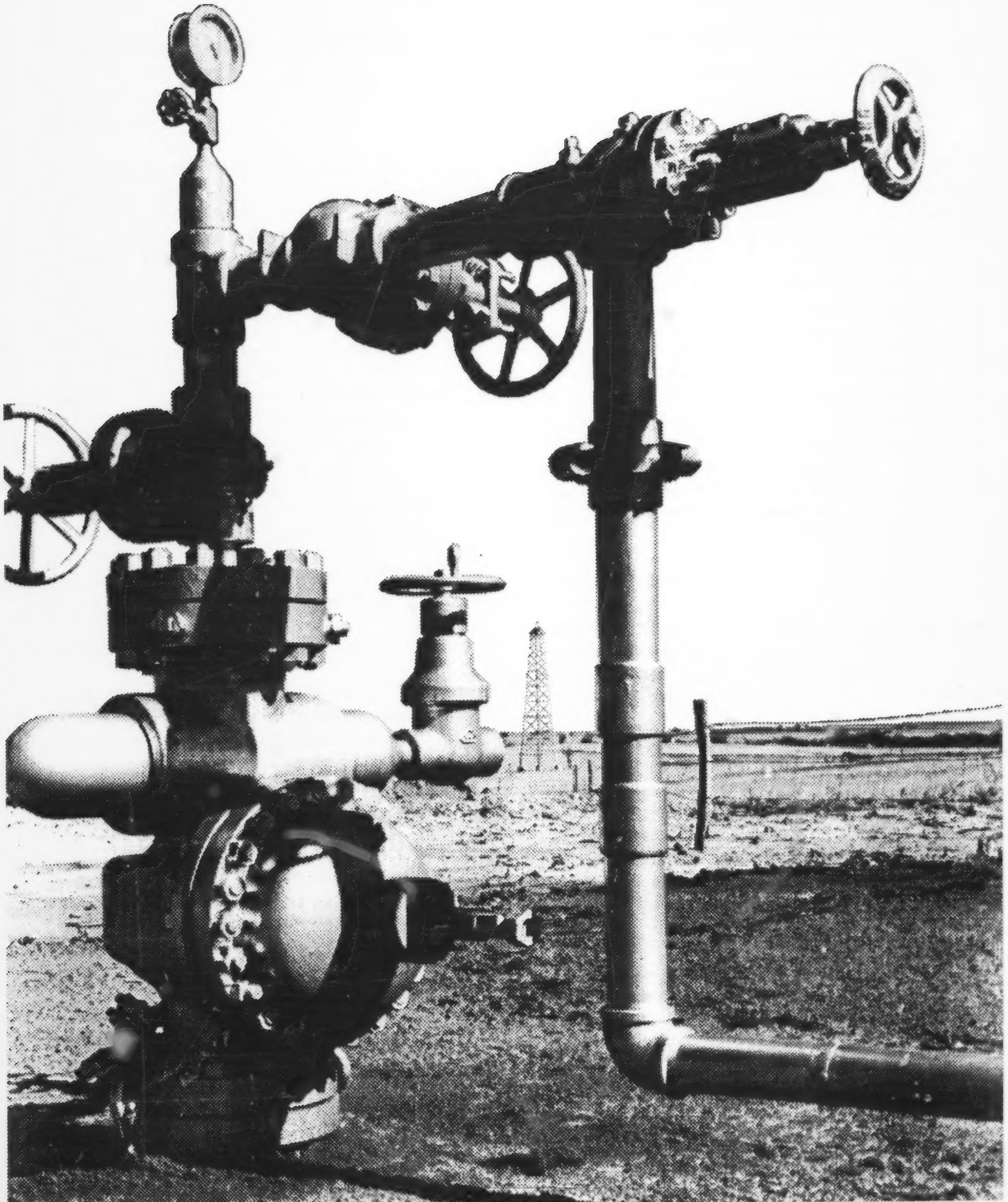
West Coast: The States of Washington, Oregon, California, Nevada, Arizona, Alaska, and Hawaii.

Petroleum Administration for Defense (PAD) Districts

Refining Districts

Appendix B

Explanatory Notes



The cluster of pipes and valves that control the flow of oil at the mouth of an oil well is what oilmen call a "Christmas Tree."

Appendix B

Explanatory Notes

Note 1: Data Collection Methodology

Background

The Petroleum Supply Reporting System (PSRS) represents a family of data collection survey forms, data processing systems and publication systems that have been consolidated to achieve comparability and consistency throughout. The survey forms that comprise the PSRS are:

Form Number	*Name*
EIA-800	Weekly Refinery Report
EIA-801	Weekly Bulk Terminal Report
EIA-802	Weekly Product Pipeline Report
EIA-803	Weekly Crude Oil Stocks Report
EIA-804	Weekly Imports Report
EIA-810	Monthly Refinery Report
EIA-811	Monthly Bulk Terminal Report
EIA-812	Monthly Product Pipeline Report
EIA-813	Monthly Crude Oil Report
EIA-814	Monthly Imports Report
EIA-816	Monthly Natural Gas Liquids Report
EIA-817	Monthly Tanker and Barge Movement Report
EIA-820	Annual Refinery Report

Forms EIA-810 through 814, 816, and 817 comprise the Monthly Petroleum Supply Reporting System (MPSRS). These surveys collect detailed refinery and natural gas plant operations data; refinery, bulk terminal, natural gas plant, and pipeline stocks data; crude oil and petroleum product imports data; and data on movements of petroleum products and crude oil between Petroleum Administration for Defense (PAD) Districts. These surveys are the primary source of data for the "Summary Statistics" and "Detailed Statistics" sections of the *Petroleum Supply Annual* (PSA). A description of MPSRS survey forms follows in Explanatory Note 1.1.

Data are also obtained on magnetic tape from the Bureau of the Census on a monthly basis. These tapes contain aggregated import and export statistics that are used in the preparation of the PSA. A description of the Census data follows in Explanatory Note 1.2.

Note 1.1: Monthly Petroleum Supply Reporting System (MPSRS)

Background

The MPSRS was implemented in January 1983 as the result of an extensive effort to integrate the collection and processing of petroleum supply data that have been collected on other survey forms for many years. The collection of monthly petroleum supply statistics began as early as 1918 when the Bureau of Mines (BOM) began collecting data on refinery operations and crude oil stocks and movements. The collection systems were further expanded to include natural gas plant liquids production and storage in 1925, imports of crude oil and petroleum products and storage and movement of petroleum products in 1959, and tanker and barge movements of crude oil and petroleum products in 1964. Since their inception, each survey has undergone numerous changes, but the MPSRS is the first effort to make them all consistent and comparable.

Respondent Frame

EIA-810: All petroleum refineries and blending plants located in the 50 States, District of Columbia, Puerto Rico, the Virgin Islands, and Guam. Approximately 240 respondents report on the EIA-810.

EIA-811: Every bulk terminal operating in the 50 States, the District of Columbia, Puerto Rico, and the Virgin Islands. A bulk terminal is primarily used for storage and/or marketing of petroleum products and has a total bulk storage capacity of 50,000 barrels or more, and/or receives petroleum products by tanker, barge, or pipeline. Bulk terminal facilities associated with a product pipeline are included. Approximately 350 respondents report on the EIA-811.

EIA-812: All product pipeline companies that carry petroleum products (including interstate, intrastate, and intracompany pipelines) in the 50 States and the District of Columbia. Approximately 90 respondents report on the EIA-812.

EIA-813: All companies which carry or store 1,000 barrels or more of crude oil. Included in this survey are gathering and trunk pipeline companies (including interstate, intrastate, and intracompany pipelines), crude oil producers, terminal operators, storers of crude oil (except refineries), and companies transporting Alaskan crude oil by water in the 50 States and the District of Columbia. Approximately 170 respondents report on the EIA-813.

EIA-814: All companies, including subsidiary or affiliated companies, that import crude oil, unfinished oils, and finished petroleum products into the United States and Puerto Rico. Approximately 860 respondents report on the EIA-814.

EIA-816: All facilities that extract liquid hydrocarbons from a natural gas stream (natural gas processing plant) and/or separate a liquid hydrocarbon stream into its component products (fractionator). Approximately 900 respondents report on the EIA-816.

EIA-817: All companies that have custody of crude oil or petroleum products transported by tanker or barge between Petroleum Administration for Defense (PAD) Districts or between the Panama Canal and the United States. For purposes of this report, custody is defined as physical possession of crude oil or petroleum products on a company owned tanker or barge. Also, companies which lease vessels or contract for the movement of crude oil or petroleum products on a tanker or barge between PAD Districts or between the Panama Canal and the United States are considered to have custody. Approximately 35 respondents report on the EIA-817.

EIA utilizes a number of sources and methods to maintain the survey respondent lists. On a regular basis, survey managers review industry publications such as the *Oil and Gas Journal* and *Oil Daily* for information on facilities or companies starting up or closing down operations. These sources are augmented by articles in newspapers, letters from respondents indicating changes in status and information received from survey systems operated by other offices.

Every three years an extensive survey is conducted to completely refresh the frames. This involves consolidating information from every known source including State agencies, Federal agencies (e.g., EPA, Corps of Engineers, Census Bureau, etc.), and private industry directories. The effort also includes the evaluation of the impact of potential frame changes on the historical time series of data published from these respondents. The results of this frame study are usually implemented in January to provide a full year under the same frame.

Collection Methods

The data for all of the MPSRS surveys are collected monthly. Completed forms are required to be postmarked by the 20th calendar day following the end of the report month, with the exception of the EIA-814 which is due 15 work days following the end of the report month. Telephone follow-up calls are made to nonrespondents prior to the publication deadline for their data. An automated mailing list is maintained and is used to monitor receipt of the forms.

Imputing Missing Data

Imputation is performed for companies that do not respond to EIA Forms 810-813 and 816. For such companies, previous monthly values are used for current values. The previous month's ending stocks value is used for both the current month's beginning stocks and the current month's ending stocks. Data for nonrespondents on the EIA-814 and 817 are not imputed.

Response Rate

The response rate is generally 99 to 100 percent by the time the data are first published. Nonrespondents are contacted in writing and reminded of their requirement to report. Companies that file late or fail to file are subject to criminal fines, civil penalties, and other sanctions as provided by Section 13(i) of the FEA Act.

Note 1.2: Census Import (IM-145) and Export (EM-522 and EM-594) Data

Background

Each month the Energy Information Administration (EIA) purchases magnetic tapes of aggregated import and export statistics from the Bureau of the Census. These data tapes are the only source of export statistics and are used to augment the import data collected by the EIA.

Import Statistics (IM-145)

Coverage

Census import statistics used in the *Petroleum Supply Annual* (PSA) reflect both government and nongovernment imports of merchandise from foreign countries and U.S. possessions into the United States (the 50 States and the District of Columbia) without regard to whether or not a commercial transaction is involved. The following types of transactions are excluded from the statistics:

(1) Merchandise in transit through the United States, when documented with Customs as an in transit movement.

(2) U.S. merchandise that was held in foreign countries by the U.S. Armed Forces and is returned to the United States for the use of the Armed Forces.

Source of Import Information

The official U.S. import statistics are compiled by the Bureau of the Census from copies of the import entry and warehouse withdrawal forms that importers are required by law to file with Customs officials (Customs Forms 7501, 7505, and 7506).

Country and Area of Origin

The country reported in the statistics as the country of origin is defined as the country where the merchandise was grown, mined, or manufactured. In instances where the country of origin cannot be determined, the transactions are credited to the country of shipment.

Export Statistics (EM-522 and EM-594)

Census export statistics used in the *PSA* reflect both government and nongovernment exports of domestic and foreign merchandise from the United States (the 50 States and the District of Columbia) to foreign countries and U.S. possessions, without regard to whether or not the exportation involves a commercial transaction. The following types of transactions are excluded from the statistics:

(1) Merchandise shipped in transit through the United States from one foreign country to another, when documented as such with U.S. Customs.

(2) Bunker fuels and other supplies and equipment for use on departing vessels, planes, or other carriers engaged in foreign trade.

Source of Export Information

The official U.S. export statistics are compiled by the Bureau of the Census. Exporters are required to file export documents with Customs officials (Customs Form 7525).

Country and Area of Destination

The country of destination is defined as the country of ultimate destination or the country where the goods are to be consumed, further processed, or manufactured, as known to the shipper at the time of exportation. If the shipper does not know the country of ultimate destination, the shipment is credited to the last country to which the shipper knows that the merchandise will be shipped in the same form as it was when exported.

Note 2: Supply

The components of petroleum supply are field production, refinery production, imports, and stock withdrawal or addition:

Field Production is the sum of crude oil production (including lease condensate), natural gas processing plant production, and new supply (field production) of other liquids used by refineries.

Crude oil production is estimated based on data received from State conservation agencies. For further explanation, see Explanatory Note 3.

Field production of natural gas plant liquids (NGPL), including finished petroleum products, is reported monthly on survey Form EIA-816, *Monthly Natural Gas Liquids Report*. Negative production will occur when the amount of a product produced during the year is less than the amount of that same product that is reprocessed (input) or reclassified to become another product during the same year. For survey descriptions and other details, see Explanatory Note 1.1.

Refinery Production of petroleum products is reported monthly on survey Form EIA-810, *Monthly Refinery Report*. Published production of these products equals refinery production minus refinery input. Refinery production of unfinished oils and of motor and aviation gasoline blending components appears on a net basis under refinery input. Negative production will occur when the amount of a product produced during the year is less than the amount of that same product that is reprocessed (input) or reclassified to become another product during the same year.

Imports of crude oil and petroleum products are reported monthly on Form EIA-814, *Monthly Imports Report*. In addition, imports of natural gas liquids (NGLs) are obtained from the Census Bureau Tabulation IM-145. The Census Bureau Tabulation IM-145 summarizes import data from Customs import declarations reported on Customs Forms 7501, 7505, and 7506. Additional data taken from the IM-145 are relatively small quantities of naphtha-type and kerosene-type jet fuels, distillate fuel oils, and residual fuel oils withdrawn from bonded storage for use in international trade. Even though these duty-free fuels are stored on United States shores, they did not enter the United States for

domestic consumption and therefore are not included in the Form EIA-814 reporting system.

Stock Withdrawal (+) or Addition (-) is calculated by subtracting stocks at the end of the year from stocks at the beginning of the same year. (Note: The beginning stocks of one year are equal to the ending stocks of the previous year.) A positive result (+) would represent a withdrawal from stocks. A negative result (-) would represent a buildup of stocks. For a description of survey forms used to make stock withdrawal or addition calculations, see Explanatory Note 5.

Unaccounted-for Crude Oil is a balancing item that represents the difference between crude oil supply and disposition. Crude oil supply is the sum of field production, imports, and stock withdrawals. Crude oil disposition is the sum of exports, refinery input, losses, stock additions, and product supplied. Unaccounted-for crude oil is calculated by subtracting crude oil supply from crude oil disposition. A positive result indicates that refiners and exporters reported use of more crude oil than was reported to have been available to them. (This occurs, for example, when imports are undercounted due to late reporting or other problems.) A negative result would indicate that more crude oil was reported to have been supplied to refiners and exporters than they reported used.

Note 3: Domestic Crude Oil Production

The Energy Information Administration (EIA) collects monthly crude oil production data on an ongoing basis. Data on crude oil production for States are reported to the EIA by State government agencies. Data on crude oil production for Federal offshore areas are reported to the EIA by the Minerals Management Service of the U.S. Department of the Interior and the Conservation Committee of California Oil Producers.

Currently, all except four crude oil producing States (Michigan, New York, Ohio, and Pennsylvania) report production on a monthly basis. These four States report crude oil production on an annual basis. After the end of each calendar year, the monthly crude oil production estimates are updated using annual reports of various State agencies, the Minerals Management Service, and the Conservation Committee of California Oil Producers.

Table 9 of this publication reflects revisions received by the EIA as of April 1989. Additional revisions received after date of this publication will be incorporated into the Crude Oil Production System (COPS) as they become available to the EIA and will be published a final time as an Appendix in the following year's *Petroleum Supply Annual*.

Note 4: Disposition

The components of petroleum disposition are crude oil losses, refinery inputs, exports, and products supplied for domestic consumption.

Crude Oil Losses is the sum of crude oil losses at refineries reported for all refineries on Form EIA-810, *Monthly Refinery Report*.

Refinery Inputs of crude oil, natural gas plant liquids, and other liquids are reported monthly on survey Form EIA-810, *Monthly Refinery Report*. Published inputs of unfinished oils and of motor and aviation gasoline blending components equal refinery input minus refinery output. Refinery inputs of finished petroleum products are reported on a net basis under refinery production.

Exports of crude oil and petroleum products are compiled from Census Bureau tabulations EM-522 and EM-594. Exports include crude oil shipments to Puerto Rico and the Virgin Islands, which are obtained from refinery receipts reported on Form EIA-810, *Monthly Refinery Report*, by refineries located in these places.

Product Supplied for each product is calculated by summing field production, plus refinery production, plus imports, plus stock withdrawal or minus stock addition, minus crude oil losses (plus net receipts when calculated on a Petroleum Administration for Defense (PAD) District basis), minus refinery input, minus exports. This formula ensures that total disposition equals total supply.

Product supplied indicates those quantities of petroleum products supplied for domestic consumption. Occasionally, the result for a product is negative because total disposition of the product exceeds total supply. Negative product supplied may occur for a number of reasons: (1) product reclassification has not been reported; (2) data were misreported or reported late; (3) in the case of calculations on a PAD District basis, the figure for net receipts was inaccurate because the coverage of interdistrict movements was incomplete; and (4) products such as gasoline blending components and unfinished oils have entered the primary supply channels with their production net having been reported, e.g., streams returned to refineries from petrochemical plants.

Product supplied for crude oil is the sum of crude oil burned on leases and by pipelines as fuel oil. These data are

reported on Form EIA-813, *Monthly Crude Oil Report*. Prior to January 1983, crude oil burned on leases and by pipelines as fuel oil were reported as either distillate or residual fuel oil and included in product supplied for these products.

Note 5: Stocks

Primary stocks of crude oil are the sum of ending stocks reported monthly on Form EIA-810, *Monthly Refinery Report*, and on Form EIA-813, *Monthly Crude Oil Report*. Crude oil held in the Strategic Petroleum Reserve is included unless otherwise noted. Alaskan crude oil in transit is also included. Primary stocks of petroleum products are summed from data reported on Form EIA-816, *Monthly Natural Gas Liquids Report*, Form EIA-810, *Monthly Refinery Report*, Form EIA-811, *Monthly Bulk Terminal Report*, and on Form EIA-812, *Monthly Product Pipeline Report*. Primary stocks of petroleum products do not include either secondary stocks held by dealers and jobbers or tertiary stocks held by consumers. For survey descriptions and other details, see Explanatory Note 1.1.

Note 6: Movements

Movements of crude oil between Petroleum Administration for Defense (PAD) Districts are reported on Form EIA-817, *Monthly Tanker and Barge Movement Report*, and on Form EIA-813, *Monthly Crude Oil Report*. Petroleum product movements are reported on Forms EIA-817, *Monthly Tanker and Barge Movement Report*, and EIA-812, *Monthly Product Pipeline Report*. Net receipts is the difference between total movements into and total movements out of each PAD District by pipeline, tanker, and barge. For survey descriptions and other details, see Explanatory Note 1.1.

Note 7: Notes on Tables

Note 7.1 Crude Oil and Petroleum Products Overview statistics on the referenced line appear in Table 3 of the "Detailed Statistics," except where noted.

- Crude Oil and Petroleum Products Stock Withdrawal (+) or Addition (-), Petroleum Products Supplied, Total Imports, Crude Oil Imports, Total Exports, and Crude Oil Exports appear as labeled in Table 3. Total Production and Crude Oil Production appear under Field Production in Table 3.
- Natural Gas Plant Production is the sum of Natural Gas Liquids and Finished Petroleum Products Field Production in Table 3.
- Petroleum Products Imports is the sum of Natural Gas Liquids and Liquefied Refinery Gases (LRGs), Other Liquids, and Finished Petroleum Products Imports in Table 3.
- Total Crude Oil and Petroleum Products Ending Stocks appear in thousand barrels in Table 2.

Note 7.2 Crude Oil Supply and Disposition statistics on the referenced line appear in Table 1 of the "Detailed Statistics," except where noted.

- Total Domestic Field Production, Alaskan Field Production, Strategic Petroleum Reserve (SPR) Imports, Other Imports (synonymous with Gross Imports Excl. SPR), SPR and Other Primary Stocks Withdrawal (+) or Addition (-), Unaccounted for Crude Oil, Refinery Inputs, and Exports appear as labeled in Table 1.
- Crude Losses and Product Supplied appear as labeled in Table 3.
- SPR Ending Stocks and Other Primary Ending Stocks (synonymous with stocks excluding SPR) appear in thousand barrels in Table 1.
- Total Crude Oil Ending Stocks appear in thousand barrels in Table 2.
- Total Imports appear in Table 3.

Note 7.3 Finished Motor Gasoline Supply and Disposition statistics on the referenced line appear in Table 3 of the "Detailed Statistics," except where noted.

- Total Production is the sum of Field Production and Refinery Production in Table 3.
- Imports, Stock Withdrawal (+) or Addition (-), Exports, and Product Supplied appear as labeled in Table 3.
- Unleaded Percent of Total Product Supplied represents the ratio of finished unleaded motor gasoline product supplied to total finished motor gasoline product supplied, multiplied by 100 and rounded to the nearest tenth.
- Ending stocks are aggregated from ending stocks in thousand barrels in Table 2.

Note 7.4 Distillate and Residual Fuel Oil Supply and Disposition statistics on the referenced lines appear in Table 3 of the "Detailed Statistics," except where noted.

- Total Production is the sum of Field Production and Refinery Production in Table 3.
- Imports, Stock Withdrawal (+) or Addition (-), Exports, and Product Supplied appear as labeled in Table 3.
- Ending stocks appear in thousand barrels in Table 2.

Note 7.5 Liquefied Petroleum Gases Supply and Disposition statistics represent the aggregation of statistics on ethane, ethylene, propane, propylene, butane, butylene, and isobutane. The statistics on the referenced line appear in Table 3 of the "Detailed Statistics," except where noted.

- Total Production is the sum of Field Production and Refinery Production in Table 3.
- Imports, Stocks Withdrawal (+) or Addition (-), Refinery Inputs, Exports, and Product Supplied appear as labeled in Table 3.
- Ending stocks appear in thousand barrels in Table 2.

Note 7.6 Other Petroleum Products Supply and Disposition statistics represent the aggregation of statistics on pentanes plus, other liquids, and all finished petroleum products except finished motor gasoline, distillate fuel oil, residual fuel oil, and liquefied petroleum gases. The statistics on the referenced line are aggregated from Table 3 of the "Detailed Statistics," except where noted.

- Total production is the aggregated sum of Field Production and Refinery Production in Table 3.
- Imports, Stock Withdrawal (+) or Addition (-), Refinery Inputs, Exports, and Product Supplied are aggregated from Table 3.
- Ending stocks are aggregated from ending stocks in thousand barrels in Table 2.

Note 7.7 Table 1. U.S. Petroleum Balance

- Lines (1) through (3): Crude oil (including lease condensate) production for *Alaska*, and *Total U.S.* appear as labeled in Table 9. *Lower 48 States* are calculated by subtracting Alaska crude oil production from Total U.S. crude oil production.
- Line (5): *SPR Imports* are reported on survey Form EIA-814.
- Line (12): *Total Other Sources* equals crude oil stock withdrawal (+) or addition (-) plus unaccounted for crude oil minus crude oil losses minus crude oil product supplied in Table 2.
- Line (14): Natural Gas Plant Liquids (NGPL) *Field Production* equals field production of natural gas liquids (NGL) plus field production of finished petroleum products in Table 2.
- Line (15): NGPL *Net Imports* equals the sum of the imports of pentanes plus minus the exports of pentanes plus in Table 2.
- Line (16): NGPL *Stock Withdrawal (+) or Addition (-)* is equal to the stock withdrawal (+) or addition (-) of pentanes plus in Table 2.
- Line (17): *Total NGPL Supply* equals the sum of lines (14), (15), and (16).
- Line (18): Other Liquids *Stock Withdrawal (+) or Addition (-)* equals the aggregate stock withdrawal (+) or addition (-) for other hydrocarbons and alcohol, unfinished oils, motor gasoline blending components, and aviation gasoline blending components in Table 2.
- Line (20): *Other Hydrocarbons and Alcohol New Supply* equals the field production of same in Table 2.
- Line (21): *Refinery Processing Gain* is a balancing item equal to total refinery production minus total refinery input in Table 2.
- Line (23): *Total Other Liquids* equals the sum of lines (18) through (22).
- Line (24): *Total Production of Products* equals crude oil input to refineries plus field production of natural gas liquids and LRG and finished petroleum products; plus imports of pentanes plus; plus stock withdrawal (+) or addition (-) of pentanes plus; plus stock withdrawal (+) or addition (-) of other liquids; plus imports of other liquids; plus field production of other liquids; plus total refinery production; minus total refinery input; plus crude oil product supplied in Table 2.
- Line (25): *Gross Imports* of Refined Products equals imports of liquefied petroleum gases (LPG) plus imports of finished petroleum products in Table 2.
- Line (26): *Exports* of Refined Products equals exports of LPG plus exports of finished petroleum products in Table 2.

- Line (27): *Net Imports* of Refined Products equals the difference between lines (25) and (26).

- Line (28): *Total New Supply of Products* equals crude oil input to refineries plus field production of natural gas liquids and LRG and finished petroleum products; plus imports of pentanes plus; plus stock withdrawal (+) or addition (-) of pentanes plus; plus stock withdrawal (+) or addition (-) of other liquids; plus imports of other liquids; plus total field production of other liquids; plus total refinery production; minus total refinery input; minus crude oil product supplied plus imports of LPG and finished petroleum products; minus exports of LPG and finished petroleum products in Table 2.

- Line (29): *Refined Products Stock Withdrawal (+) or Addition (-)* equals the sum of stock withdrawal (+) or addition (-) for LPG and finished petroleum products in Table 2.

- Line (30): *Total Petroleum Products Supplied for Domestic Use* equals total products supplied in Table 2.

- Lines (31) through (34): Equals the respective products supplied in Table 2.

- Line (35): *Other Products Supplied* equals the sum of pentanes plus, aviation gasoline, naphtha-type jet fuel, kerosene-type jet fuel, naphtha <400 Deg. F. for petrochemical feedstock use, other oils >400 Deg. F. for petrochemical feedstock use, special naphthas, lubricants, waxes, petroleum coke, asphalt and road oil, still gas, unfinished oils, motor gasoline blending components, aviation gasoline blending components, and miscellaneous products supplied in Table 2.

- Line (37): *Total Product Supplied* is equal to total products supplied in Table 2.

- The sum of lines (38) and (39): Stocks of *Crude Oil and Lease Condensate (Excluding SPR)* and stocks held by the *Strategic Petroleum Reserve* equals ending stocks of crude oil in Table 2.

- Line (43): Stocks of *Finished Refined Products* equals the sum of liquefied petroleum gases and finished petroleum products stocks in Table 2.

Note 8: New Stock Basis

In January 1975, 1981, and 1983, numerous respondents were added to bulk terminal and pipeline surveys affecting subsequent stocks reported and stock withdrawal calculations. Using the expanded coverage (new basis), the end-of-year stocks, in million barrels, would have been:

- Crude Oil: 1982 - 645 (Total) and 351 (Other Primary).

- Crude Oil and Petroleum Products: 1974 - 1,121; 1980 - 1,425; and 1982 - 1,462.

- Motor Gasoline: 1974 - 225; 1980 - 263; 1982 - 244 (Total) and 203 (Finished).

- Distillate Fuel Oil: 1974 - 224; 1980 - 205; and 1982 - 186.

- Residual Fuel Oil: 1974 - 75; 1980 - 91; and 1982 - 68.

- Liquefied Petroleum Gases: 1974 - 113; 1980 - 128; and 1982 - 103.

- Other Petroleum Products: 1974 - 220; 1980 - 249; and 1982 - 259.

- Stock withdrawal calculations beginning in 1975, 1981, and 1983 were made using new basis stock levels.

In January 1984, changes were made in the reporting of natural gas liquids. As a result, unfractionated stream, which was formerly included in "Other Petroleum Products Supply and Disposition" table in the "Summary Statistics," is now reported on a component basis (ethane, propane, normal butane, isobutane, and pentanes plus). Most of these stocks will now appear in the "Liquefied Petroleum Gases Supply and Disposition" table of the "Summary Statistics." This change will affect stocks reported and stock withdrawals in each table. Under the new basis, end-of-year 1983 stocks, in million barrels, would have been:

- Liquefied Petroleum Gases: 1983 - 108.

- Other Petroleum Products: 1983 - 248.

Note 9: Stocks of Alaskan Crude Oil

Stocks of Alaskan crude oil in transit were included for the first time in January 1981. The major impact of this change is on the reporting of stock withdrawal calculations. Using the expanded coverage (new basis), 1980 end-of-year stocks, in million barrels, would have been 488 (Total) and 380 (Other Primary).

Note 10: 1981 Changes in Petroleum Industry Reporting

Petroleum statistics contained in this report for all years through 1980 were developed using definitions, concepts, reporting procedures, and aggregation methods that are consistent with those developed by the U.S. Bureau of Mines. Research conducted by the Energy Information Administration (EIA) in 1979 and 1980 indicated that changes had occurred in the petroleum industry that were not being adequately reflected in EIA's reporting system.

EIA reporting forms, definitions, and procedures were modified beginning in January 1981 to describe industry operations more accurately. Unfortunately, empirical information is not available to precisely measure the data shortcomings through 1980. However, estimates of the magnitudes of differences in the major data series are described below to form a basis for comparing 1979, 1980, and 1981 data.

Motor Gasoline

Prior to 1979, the EIA product-supplied series for motor gasoline was consistently about 2 percent lower than the Federal Highway Administration (FHWA) gasoline-sales data series, which is derived from State tax receipts. The difference increased to about 3 percent in 1979 and 1980. There were two primary causes for this growing difference. First, refinery operations, particularly the flows of unfinished oils and the redesignation of some finished products, were not being accurately described on the EIA survey forms. Second, a large amount of gasoline was being produced away from refineries at "downstream blending stations" to take advantage of provisions in regulations governing the amount of lead that could be added. These blending stations were not reporting gasoline production to the EIA until the data system was changed in January 1981.

Quantitative estimates of the magnitude of the difference in EIA's gasoline product supplied data in 1979 and 1980 have been made by the EIA and the American Petroleum Institute (API). Table B1 provides 1979 and 1980 data as published in the *Petroleum Statement, Annual*, as well as EIA and API estimates of "recast" motor gasoline product supplied.

EIA recast estimates were based upon preliminary monthly information in the *Monthly Petroleum Statement*. The ranges displayed in the EIA column reflect uncertainty in the estimates. Also shown are the FHWA motor gasoline sales statistics for those years.

Table B1. Finished Motor Gasoline Product Supplied
(Thousand Barrels per Day)

	EIA Reported	API Recast	EIA Recast	FHWA[a]
1979....	7,034	7,302	7,183-7,347	7,258
1980....	6,579	6,882	6,806-6,889	6,792

[a]FHWA gasoline statistics based on data from Federal Highway Administration, Estimate of Total Gasoline Use, Table MF-21A published October 1980 and September 1981. Aviation gasoline (Table MF-24) has been subtracted from FHWA product supplied quantities to make data comparable.

Distillate and Residual Fuel Oil

Distillate and residual fuel oil refinery production statistics through 1980 were adjusted to account for an imbalance between unfinished oil supply and disposition. The reported quantities of refinery inputs of unfinished oils typically exceed the available supply of unfinished oils. It has been assumed that this occurs when distillate and residual fuel oils produced by a refinery are shipped to another refinery, where it is treated as unfinished oil. This oil is then reprocessed rather than used or sold as distillate or residual fuel oil.

For many years (including 1980), the difference between unfinished oil disposition and supply was subtracted from distillate and residual fuel oil production to adjust for this discrepancy. Two-thirds of the difference was applied to distillate, and one-third to residual fuel oil.

Beginning in January 1981, this adjustment was discontinued because there was not sufficient empirical evidence to support it. Table B2 presents distillate and residual fuel oil refinery production in 1979 and 1980 as published (adjusted) and on the same basis as 1981 statistics (unadjusted) to permit comparison.

Adjusted distillate and residual fuel oil product supplied volumes differ from the unadjusted volumes by the same amounts as the adjusted and unadjusted production volumes.

Table B2. Distillate and Residual Fuel Oil Production and Product Supplied
(Thousand Barrels per Day)

	Adjusted Refinery Production	Unadjusted Refinery Production	Difference	Unadjusted Product Supplied
Distillate Fuel Oil				
1979	3,152	3,169	16	3,327
1980	2,661	2,764	103	2,969
Residual Fuel Oil				
1979	1,687	1,695	8	2,834
1980	1,580	1,634	54	2,562

Total Petroleum Products

The imbalance between the supply and disposition of unfinished oils and gasoline blending components is included with other products (line 35) in the U.S. Petroleum Balance (Table 1). These imbalances are reported as negative product supplied in the Other Liquids section, Supply and Disposition Statistics (Table 2). Since these changes only involve redistribution of the volumes of gasoline, distillate and residual fuel oil, gasoline blending components, and unfinished oils, the total volume of petroleum products supplied remains unaffected by them.

Note 11: Natural Gas Liquids Reporting Changes

Beginning in January 1984, a number of changes in the reporting of natural gas liquids (NGL) were implemented. The modified system reflects supply and disposition of NGL on a component, rather than product, basis.

From 1979 to 1983, the EIA collected and reported information on the supply and disposition of nine NGL products. Beginning with January 1984, NGL supply and disposition data were reported on a five component basis (see table below) to be consistent with record-keeping practices used by the industry. Table B3 shows the product categories under the new and old basis.

Four PSRS surveys were modified beginning in January 1984. They were:

EIA-810 *Monthly Refinery Report*
EIA-811 *Monthly Bulk Terminal Report*
EIA-812 *Monthly Product Pipeline Report*
EIA-816 *Monthly Natural Gas Liquids Report*

Table B3. Product Basis vs. Component Basis Reporting

1979-1983 Product Basis	1984 Component Basis: Ethane	Propane	Normal Butane	Isobutane	Pentanes Plus
Ethane	•				
Ethane-Propane Mixtures	•	•			
Propane		•			
Butane-Propane Mixtures		•	•		
Butane			•		
Isobutane				•	
Unfractionated Stream	•	•	•	•	•
Natural Gasoline and Isopentane					•
Plant Condensate					•

A fifth survey, the Form EIA-814, *Monthly Imports Report* (formerly Form ERA-60), was not modified. Adjustments are applied to NGL imports data to make them consistent with the revised reporting system (See Explanatory Note 12).

Note 12: NGL Import/Export Algorithms

Beginning in January 1984, the Energy Information Administration (EIA) implemented changes in the reporting of natural gas liquids (NGL) supply data, moving from a nine-product slate basis to a five-component slate basis that corresponds to industry record-keeping practices. Changes could not be made to the import and export systems. Therefore, in order to allocate imports and exports of mixed NGL streams to individual component parts, the EIA developed a statistical algorithm.

Imports

The imports algorithm is based on information gathered from the larger importers of NGL, who were asked to provide component analysis of the products they imported during the first six months of 1983. The percentages shown in Table B4 are derived from the weighted averages of the data provided by the importers.

Exports

The export algorithm is based on information gathered from the larger exporters of NGL, who were asked to provide component analysis of the products they exported during 1983. The percentages shown in Table B4 are derived from the weighted averages of the data provided by the exporters.

It was necessary to derive percentages by Petroleum Administration for Defense (PAD) Districts of exportation, due to the wide variation of components included in the mixed streams.

Note 13: Statistical Notes

The universe of each of the Petroleum Supply surveys (refinery, bulk terminal, pipeline, crude oil stock, import, etc.,) is relatively small and ever-changing due to company births, deaths, mergers and splits. The frequency distributions of the petroleum supply variables are non-normal, highly variable, positive skewed and leptokurtic; that is, there are many small units and few large ones. Zeros often dominate the responses; that is, not all of the sampling units produce and/or store all products.

The statistics described in Table B5 were calculated from the monthly surveys over a 12-month period.

(1) The number of active sampling units (respondents).

Table B4. Algorithm for Allocating NGL Imports/Exports
(Percent)

	EIA Component Slate				
	Ethane	Propane	Normal Butane	Isobutane	Pentanes Plus
Import Product					
Natural Gasoline and Isopentane (EIA-814)	--	--	--	--	100
Plant Condensate (EIA-814)	--	--	--	--	100
Ethane (IM-145)	100	--	--	--	--
Propane (IM-145)	--	100	--	--	--
Butane (IM-145)	--	--	65	35	--
Butane-Propane Mixtures (IM-145)	--	40	35	20	5
Ethane-Propane Mixtures (IM-145)	60	40	--	--	--
Export Product					
Ethane (All PAD Districts)	100	--	--	--	--
Propane(All PAD Districts)	--	100	--	--	--
Butane (All PAD Districts)	--	--	100	--	--
Mixed Streams					
PAD Districts I, IV, V	--	40	60	--	--
PAD District II	30	25	15	15	15
PAD District III	--	80	20	--	--

Table B5. Descriptive Statistics for Selected Petroleum Supply Variables

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Refinery Gross Input to Atmospheric Crude Oil Distillation Units												
Respondents	242	238	232	236	235	234	234	234	234	233	230	227
Nonzero Respondents	182	182	185	186	185	185	181	196	186	186	187	186
Average	2,242	2,052	2,216	2,151	2,283	2,221	2,362	2,326	2,154	2,217	2,142	2,259
Standard Deviation	2,518	2,315	2,507	2,471	2,600	2,457	2,587	2,602	2,389	2,520	2,433	2,493
Refinery Crude Oil Input												
Respondents	242	238	232	236	235	234	234	234	234	233	230	227
Nonzero Respondents	183	182	185	185	185	184	182	186	186	185	187	185
Average	2,196	2,021	2,188	2,136	2,256	2,205	2,325	2,300	2,147	2,208	2,119	2,251
Standard Deviation	2,481	2,286	2,478	2,460	2,571	2,435	2,565	2,581	2,385	2,508	2,403	2,482
Refinery Finished Leaded Motor Gasoline Gross Production												
Respondents	242	238	232	236	235	234	234	234	234	233	230	227
Nonzero Respondents	152	151	149	152	147	147	148	150	147	142	143	144
Average	271	259	280	274	288	287	294	274	249	261	252	257
Standard Deviation	265	263	268	274	282	269	279	266	228	259	254	278
Refinery Finished Unleaded Motor Gasoline Gross Production												
Respondents	242	238	232	236	235	234	234	234	234	233	230	227
Nonzero Respondents	165	165	165	163	165	164	165	164	160	164	163	163
Average	1,021	958	1,019	1,019	1,037	1,025	1,086	1,120	1,085	1,077	1,084	1,167
Standard Deviation	1,156	1,077	1,145	1,155	1,198	1,151	1,269	1,279	1,235	1,242	1,230	1,299
Refinery Distillate Fuel Oil Gross Production												
Respondents	242	238	232	236	235	234	234	234	234	233	230	227
Nonzero Respondents	180	177	181	180	178	181	178	181	182	184	183	183
Average	529	450	477	490	524	492	497	502	472	491	491	532
Standard Deviation	601	485	527	552	562	520	514	528	489	550	550	598

Table B5. Descriptive Statistics for Selected Petroleum Supply Variables (Continued)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Refinery Residual Fuel Oil Gross Production												
Respondents	242	238	232	236	235	234	234	234	234	233	230	227
Nonzero Respondents	145	144	143	143	144	141	140	141	142	146	147	149
Average	222	211	218	207	194	196	211	200	192	200	201	232
Standard Deviation	324	333	340	319	283	290	311	291	269	288	290	334
Refinery Finished Leaded Motor Gasoline Stocks												
Respondents	242	238	232	236	235	234	234	234	234	233	230	227
Nonzero Respondents	157	157	155	152	154	153	150	152	149	148	149	145
Average	89	89	85	83	73	70	72	73	64	64	67	78
Standard Deviation	87	93	83	88	70	72	68	75	63	66	68	85
Bulk Terminal Finished Leaded Motor Gasoline Stocks												
Respondents	305	305	309	309	309	305	304	298	299	298	322	322
Nonzero Respondents	141	142	142	141	141	140	138	137	136	133	133	129
Average	195	182	168	162	155	148	165	172	168	146	141	154
Standard Deviation	409	382	349	337	329	319	364	409	403	305	284	298
Pipeline Finished Leaded Motor Gasoline Stocks												
Respondents	81	81	81	81	81	82	82	83	83	83	84	83
Nonzero Respondents	51	47	51	47	51	51	47	46	49	50	48	51
Average	246	248	230	247	231	222	236	214	194	197	198	176
Standard Deviation	380	373	387	376	376	383	372	289	291	328	312	324
Refinery Finished Unleaded Motor Gasoline Stocks												
Respondents	242	238	232	236	235	234	234	234	234	233	230	227
Nonzero Respondents	170	170	169	169	169	169	169	166	167	169	169	167
Average	232	237	230	213	219	204	206	222	209	215	230	228
Standard Deviation	270	299	268	230	271	247	256	266	231	277	267	256
Bulk Terminal Finished Unleaded Motor Gasoline Stocks												
Respondents	305	305	309	309	309	305	304	298	299	298	322	322
Nonzero Respondents	149	154	152	152	152	148	147	148	145	147	146	143
Average	440	446	431	416	429	384	395	401	439	420	428	467
Standard Deviation	978	1,038	969	950	984	886	890	915	1,050	992	1,028	1,091
Pipeline Finished Unleaded Motor Gasoline Stocks												
Respondents	81	81	81	81	81	82	82	83	83	83	84	83
Nonzero Respondents	53	54	53	54	52	55	54	54	52	55	56	53
Average	788	786	780	810	801	743	777	792	812	793	794	846
Standard Deviation	1,729	1,725	1,630	1,801	1,725	1,684	1,681	1,675	1,794	1,740	1,907	1,844
Refinery Distillate Fuel Oil Stocks												
Respondents	242	238	232	236	235	234	234	234	234	233	230	227
Nonzero Respondents	200	194	193	195	194	196	195	196	198	196	195	196
Average	199	168	150	165	182	208	205	213	213	209	202	190
Standard Deviation	281	216	196	198	205	271	258	306	282	270	250	250
Bulk Terminal Distillate Fuel Oil Stocks												
Respondents	305	305	309	309	309	305	304	298	299	298	322	322
Nonzero Respondents	234	232	230	230	227	228	227	229	227	224	229	229
Average	260	235	176	177	202	205	240	261	286	285	282	259
Standard Deviation	719	640	477	476	537	546	567	628	708	681	707	642
Pipeline Distillate Fuel Oil Stocks												
Respondents	81	81	81	81	81	82	82	83	83	83	84	83
Nonzero Respondents	54	56	57	55	58	56	56	56	55	54	57	57
Average	506	413	355	401	410	409	454	431	441	432	438	475
Standard Deviation	1,269	1,090	870	962	1,066	973	1,219	1,072	1,010	1,119	1,184	1,335
Refinery Residual Fuel Oil Stocks												
Respondents	242	238	232	236	235	234	234	234	234	233	230	227
Nonzero Respondents	164	162	162	162	159	160	159	160	161	160	159	159
Average	115	116	116	114	120	110	105	105	115	107	116	111
Standard Deviation	169	183	172	164	167	154	145	147	168	156	171	164
Bulk Terminal Residual Fuel Oil Stocks												
Respondents	305	305	309	309	309	305	304	298	299	298	322	322
Nonzero Respondents	71	71	71	72	72	73	72	70	71	70	71	69
Average	379	367	348	335	367	332	334	303	366	361	358	387
Standard Deviation	778	764	707	646	815	707	719	667	741	660	666	737
Refinery Crude Oil Stocks												
Respondents	242	238	232	236	235	234	234	234	234	233	230	227
Nonzero Respondents	185	183	181	183	182	182	182	182	183	182	183	183
Average	534	533	557	586	580	593	567	559	558	567	525	503
Standard Deviation	646	665	681	709	692	730	679	676	693	704	665	612
Pipeline/Tank Farm Crude Oil Stocks												
Respondents	130	130	129	131	129	128	128	127	127	128	127	129
Nonzero Respondents	124	124	123	124	120	120	119	119	121	121	121	121
Average	1,593	1,619	1,707	1,664	1,754	1,735	1,729	1,638	1,517	1,575	1,616	1,601
Standard Deviation	3,105	3,309	3,450	3,321	3,600	3,461	3,481	3,197	2,954	3,060	3,208	3,156

(2) The number of sampling units reporting nonzero values (nonzero respondents).

(3) The average of nonzero values reported in thousand barrels (average).

(4) The standard deviation of nonzero values reported in thousand barrels (standard deviation).

Note 14: Addition of Crude Oil Pipeline Movements Data

Beginning in January 1985, inter-Petroleum Administration for Defense (PAD) District pipeline movements of crude oil were included in the crude oil supply balance at the PAD District level but did not affect National level statistics. As a result of including these movements, *Net Receipts* of crude oil and *Unaccounted for Crude Oil* at the PAD District level changed significantly. Also affected were crude oil imports and unfinished oil imports at the PAD District level which are provided by *PAD District of entry* (Tables 4-8) and by *PAD District of processing* (Table 14).

The tables in the *Petroleum Supply Annual* (PSA) that were changed due to the inclusion of inter-PAD District pipeline movements of crude oil are listed below.

- Tables 4-8, "PAD Districts I to V, Supply and Disposition of Crude Oil and Petroleum Products." *Net Receipts* includes movements by pipeline as well as tanker and barge.
- Table 20, "Movements of Crude Oil and Petroleum Products by Pipeline, Tanker, and Barge Between PAD Districts." The crude oil line includes movements by pipeline as well as by tanker and barge.
- Table 21, "Movements of Crude Oil and Petroleum Products by Pipeline Between PAD Districts." A line was added to report crude oil movements.
- Table 23, "Net Movements of Crude Oil and Petroleum Products by Pipeline, Tanker, and Barge Between PAD Districts." The crude oil line includes net movements by pipeline as well as by tanker and barge.

Note 15: 1986 Changes in Petroleum Industry Reporting

Beginning in January 1986, several changes to the Petroleum Supply Reporting System (PSRS) went into effect. These changes affected the frame of operators of petroleum facilities required to complete the monthly surveys in the PSRS and resulted in some changes to the tables presented in the *Petroleum Supply Annual* (PSA).

Changes in Survey Frames

As a result of frames maintenance activities, 39 respondents were added to the monthly survey frames. Table B6 shows the impact of the data reported by the new respondents on published data for production and stocks of major petroleum products.

Also, beginning in January 1986, a major integrated petroleum company consolidated production and stocks reporting for some of its facilities. Data previously reported separately on Form EIA-811, *Monthly Bulk Terminal Report*, and on Form EIA-816, *Monthly Natural Gas Liquids Report*, for two facilities, have been combined with data reported for two refineries on Form EIA-810, *Monthly Refinery Report*. The primary impact of this reporting change is on Table 18, "Stocks of Crude Oil and Petroleum

Table B6. Impact of New Respondents to December 1985 PSM Data

Product	Refinery Production (thousand barrels per day)		Stocks[a] (thousand barrels)	
	Reported by New Respondents	Published U.S. Total	Reported by New Respondents	Published U.S. Total
Leaded Gasoline	1.3	2,326	224	81,379
Unleaded Gasoline	0.6	4,323	276	108,422
Distillate Fuel Oil	0	3,174	1,217	143,911
Residual Fuel Oil	0	1,055	1,747	50,671
NGLs & LRGs	0	393	409	80,898
Other Products	0	3,302	1,413	239,158
Crude Oil (excl. SPR)	--	--	2,314	318,695

[a] Stocks as of December 31, 1985.

Products by PAD District," which will show a decrease in natural gas liquids (NGL) stocks at bulk terminals and natural gas processing plants, and an increase in NGL stocks at refineries.

Changes in Publication Tables

Several changes have been made to tables in the PSA either as a direct result of changes in reporting requirements or to improve the usefulness of the publication. These changes are:

- Table 11, "Refinery Input of Crude Oil and Petroleum Products by PAD District"
  - Alaskan crude oil receipts are now shown separately.
- Table 12, "Refinery Production of Petroleum Products by PAD District"
  - The "petrochemical feedstock use" and "other use" are no longer shown separately for still gas or for liquefied refinery gases.
- Table 14, "Imports of Crude Oil and Petroleum Products by PAD District"
  - Imports of unfinished oils are now separated into four categories: naphthas and lighter, kerosene and light gas oils, heavy gas oils, and residuum.
- Table 15, "Imports of Crude Oil and Petroleum Products by Source".
  - Countries formerly included in the categories "Other Western Hemisphere" and "Other Eastern Hemisphere" are shown individually.
- Table 18, "Stocks of Crude Oil and Petroleum Products by PAD District"
  - The breakout between "petrochemical feedstock use" and "other use" for each liquefied petroleum gas was eliminated.

Note 16: 1987 Changes in the Petroleum Supply Reporting System

Several changes to the Petroleum Supply Reporting System went into effect at the beginning of January 1987. These changes were made as part of the Energy Information Administration's (EIA's) continuing effort to provide pertinent, timely and consistent energy information.

Changes in Data Collection and Reporting Systems

- Fresh feed input to catalytic cracking units, hydrocracking units and cokers were added to the Form EIA-810, *Monthly Refinery Report*.

Changes in Publication Tables

- The "Appalachian No. 2" Refining District has been combined with the "Indiana, Illinois, Kentucky," Refining District. This affects *Petroleum Supply Annual* (PSA) Tables 10, 11, 12, 13, 18, 24, and 25.
- Fresh feed inputs to catalytic cracking units, hydrocracking units and cokers are included in Table 11, "Refinery Input of Crude Oil and Petroleum Products by PAD District."

Clarification

In 1986, several refineries and terminals in the United States applied for Foreign Trade Zone (FTZ) status and applications from three refineries were approved. Consequently, during 1986, some refineries with FTZ status were treated as if they were within the United States while the Hawaiian FTZ was considered outside.

- Effective with the January 1987 data, all Foreign Trade Zone facilities located within the 50 United States are considered domestic entities and are included in statistics in the PSA. The principal differences in the PSA data series are about a 1 percent increase in crude oil imports and a 3 percent decrease in product imports.

Note 17: EIA-820: Annual Refinery Report

Background

The Form EIA-820, *Annual Refinery Report*, is used to collect data measuring the preceding year's volume of fuels consumed for all purposes at the refinery; the preceding year's volume of refinery receipts of crude oil by method of transportation; current and next year projections for operable atmospheric crude oil distillation capacity, downstream charge capacity and production capacity; and current year working and shell storage capacity for crude oil and petroleum products at the refinery.

Refinery capacity data collection was begun in 1918 by the Bureau of Mines (BOM), then in the Department of Commerce, and was operated on a voluntary basis until 1980. In 1980, the mandatory Energy Information Administration (EIA) Form EIA-177, *Capacity of Petroleum Refineries*, was implemented. Information on refining capacity was expanded to include not only current year operations but two year projections, and refinery input/production data were requested. Working storage capacity data was also added to the form and product categories were added for total coverage. Information on refinery downstream facilities was expanded to include a breakdown of thermal operations and to add vacuum distillation, catalytic hydrorefining and hydrotreating. Production capacity was also added to collect information on isomerization, alkylation, aromatics, asphalt, coking, lubes and hydrogen.

In 1983, the form was revised to improve the consistency and quality of the data collected by the EIA and redesignated as Form EIA-820, *Annual Refinery Report*. Two sections for data previously reported monthly were added to the annual: (1) refinery receipts of crude oil by method of transportation, and (2) fuels consumed for all purposes at refineries. Also, the second year projections were eliminated. As a result of a study conducted by the EIA evaluating motor gasoline data collected by the Federal Highway Administration (FHWA) and by the EIA, motor gasoline blending plants were included for the first time to the universe of respondents in order to produce more accurate statistics on the production of motor gasoline.

In 1987, the form was revised to reduce respondent burden and to better reflect current refinery operations through updated terminology. Information on projected input/production of refinery processing facilities was deleted. Several categories under catalytic hydrotreating were combined: naphtha and reformer feeds were combined into a single category as well as residual fuel oil and other. Thermal cracking types, gas oil and other were also combined into a single category. Catalytic reforming types, conventional and bi-metallic were replaced with low and high pressure processing units. Two new categories were added: fuels solvent deasphalting was added to downstream charge capacity and sulfur recovery was added to production capacity.

Description of Survey Universe

The reporting universe consists of all operating and idle petroleum refineries (including new refineries under construction), blending plants, shutdown refineries with usable storage capacity, and refineries shut down during the previous year, located in the 50 States, the District of Columbia, Puerto Rico, the Virgin Islands, and Guam. As of January 1, 1989, there were 204 refineries and 23 motor gasoline blending plants operating in the 50 States.

The list of respondents is maintained by monitoring the monthly Form EIA-810, *Monthly Refinery Report*, and industry publications for changes and developments in the petroleum industry such as refinery sales, mergers and new operations.

Information Collected

The main items of information collected annually are fuels consumed for all purposes at the refinery during the preceding year; refinery receipts of crude oil by method of transportation during the preceding year; current and next year projections for operable atmospheric crude oil distillation capacity, downstream charge capacity and production capacity; and current year working and shell storage capacity for crude oil and petroleum products at the refinery.

Collection Methods

The Form EIA-820 is sent to respondents during the month of December and completed forms are required to be postmarked by the 15th day of February of the current report year.

Receipt of the reports are monitored using an automated respondent mailing list. Telephone follow-up calls are made to secure responses from those companies failing to report by February 15th. Data are estimated and noncompliance procedures are implemented for those companies still not reporting data by closeout for the report year. Resubmissions are required whenever an error greater than five percent of the true value is discovered. In the event of a reporting error, company reports are updated after contact with the company and are followed-up by corrected report resubmissions.

Imputing Missing Data

The response rate for the Form EIA-820 is normally very high. For the January 1, 1989 survey, only two refineries did not respond, and their total operating capacity is estimated to be less than 0.2 percent of the U.S. total. Values for these refineries have been imputed from data reported on Form EIA-810, *Monthly Refinery Report*. For nonrespondents, the following imputation methodology is applied:

Section 1: Fuel, Electricity, and Steam Consumed for All Purposes at Refineries

The estimates for this section are based upon data reported on the monthly Form EIA-810, *Monthly Refinery Report*, and the previous year's annual report. A ratio of the fuel use reported on the previous year's annual report to the fuel use

and losses reported on the aggregated monthly data for the previous year is derived for each product category. To arrive at a fuels consumed quantity, this ratio is applied to the current monthly aggregated data for similar product categories (i.e., to arrive at 1988 fuels consumed data, a ratio of fuel use reported for 1987 on the annual report (1988 report) to fuel use and losses reported on the aggregated monthly data for 1987 is derived for each product category. This ratio is then applied to the 1988 aggregated monthly data for similar product categories).

Section 2: Refinery Receipts of Crude Oil by Method of Transportation

The estimates for this section are based on data reported on the monthly Form EIA-810, *Monthly Refinery Report*. The monthly data for 1988 are summed to arrive at a total for domestic and foreign receipts of crude oil. The method of transportation is taken from the previous year's annual report. The total receipts for 1988 are distributed proportionately to the method of transportation categories using 1987 data reported for these categories.

Section 3: Operable and Storage Capacity as of January 1

Estimates for atmospheric crude oil distillation capacity in barrels per calendar day, are taken directly from the January 1989 Form EIA-810, *Monthly Refinery Report*. A barrels per stream day capacity is then derived by dividing the reported barrels per calendar day capacity by .95. Current year and projected year data for downstream charge capacity and production capacity are taken from the previous year's annual report. Estimates for working and shell storage capacity are taken directly from the previous year's annual report.

Note 18: Annual Refinery Report-Accuracy of the Data

There are two types of errors usually associated with data produced from a survey—sampling errors and nonsampling errors. Sampling errors are those errors that occur when survey estimates are based on a sample rather than being derived from a complete census of the frame. Nonsampling errors, sometimes referred to as biases, are those which can arise from a number of sources: (1) the inability to obtain data from all companies in the frame or sample (nonresponse) and the method used to account for nonresponses, (2) definitional difficulties and/or improperly worded questions which lead to different interpretations, (3) mistakes in recording or coding the data obtained from respondents, and (4) other errors of collection, response, coverage, and estimation. Because estimates from the Form EIA-820 survey are based on a complete census of the frame of petroleum refineries and motor gasoline blending plants, there is no sampling error in the data presented in this report. The data, however, are subject to nonsampling errors. Quality control procedures are employed in the collection and editing operations in an attempt to minimize misrepresentation and misreporting. Nonresponse follow-up procedures are employed to reduce the number of nonrespondents, and procedures employed to impute missing data, introduce a minimal amount of bias, given the relatively small volume of imputed data.

Note 19: Annual Refinery Report-Motor Gasoline Blending Plants

Most finished motor gasoline production occurs at petroleum refineries. However, some production takes place at blending facilities which mechanically blend gasoline components into finished motor gasoline. The following is a list of motor gasoline blending plants and their locations that operated during 1988.

Citgo Petroleum Corp.
Linden, New Jersey

Edgington Oil Co. Inc.
Signal Hill, California

Enron Gas Processing Inc.
Brooker, Florida

GATX Terminal Corp.
Pasadena, Texas

GATX Terminal Corp.
Carteret, New Jersey

Hartford/Woodriver Term.
Hartford, Illinois

Intercontinental Term.Co.
Deer Park, Texas

ITAPCO
New Albany, Indiana

New Haven Terminals Inc.
East Haven, Connecticut

Northville Industries Corp.
Linden, New Jersey

Northville Industries Corp.
Riverhead, New York

Northville Industries Corp.
Setauket, New York

Oiltanking of Texas Inc.
Houston, Texas

Petro-Diamond Term. Co.
Long Beach, California

Phillips 66 Co.
Jefferson City, Missouri

Phillips 66 Co.
East Chicago, Indiana

Phillips 66 Co.
East St. Louis, Illinois

Phillips 66 Co.
Decatur, Illinois

Phillips 66 Co.
Kansas City, Kansas

Quaker State Oil Refining
Emlenton, Pennsylvania

Spruce Oil
Denver, Colorado

Westec Petroleum Inc.
Grand Junction, Colorado

Wickland Oil Terminal Co.
Crockett, California

Appendix C

1987 Revised Crude Oil Production

Surface aerators are used at U.S. petroleum refineries to help prevent water pollution. These aerators speed up the oxidation process by beating air into water.

Appendix C

Table C1. Revised[a] Crude Oil Production by PAD District and State, 1987
(Thousand Barrels)

PAD District and State	January	February	March	April	May	June	July
PAD District I	**1,245**	**1,134**	**1,314**	**1,286**	**1,310**	**1,236**	**1,290**
Florida	689	590	701	685	728	657	703
New York	56	56	64	63	64	65	59
Pennsylvania	265	258	288	300	280	285	279
Virginia	1	1	1	2	1	1	1
West Virginia	234	229	259	236	237	228	247
PAD District II	**26,648**	**25,088**	**27,343**	**27,257**	**26,303**	**26,308**	**26,993**
Illinois	2,000	1,898	2,080	1,985	1,982	1,995	2,050
Indiana	347	343	357	358	219	326	356
Kansas	5,212	4,793	4,653	5,359	5,036	5,057	5,238
Kentucky	463	459	494	478	490	477	494
Michigan	2,275	2,016	2,218	2,168	2,219	2,175	2,198
Missouri	8	9	9	9	8	11	13
Nebraska	540	484	510	510	521	509	514
North Dakota	3,661	3,291	3,619	3,514	3,548	3,383	3,509
Ohio	1,009	977	1,123	1,023	1,040	1,007	1,010
Oklahoma	10,947	10,640	12,093	11,675	11,055	11,178	11,416
South Dakota	137	123	134	132	141	139	141
Tennessee	49	56	55	45	45	51	54
PAD District III	**121,566**	**110,549**	**122,051**	**117,049**	**118,341**	**113,389**	**117,154**
Alabama	1,733	1,579	1,783	1,669	1,766	1,741	1,803
Arkansas	1,193	1,077	1,267	1,225	1,244	1,167	1,184
Louisiana[b]	14,816	13,477	15,650	14,868	14,701	14,004	14,758
Mississippi	2,447	2,197	2,444	2,347	2,450	2,352	2,468
New Mexico	6,127	5,566	6,182	5,903	6,057	5,805	6,064
Texas[b]	66,206	60,052	66,212	63,745	64,543	61,884	63,790
Federal Offshore PAD District III	29,044	26,601	28,513	27,293	27,580	26,436	27,087
PAD District IV	**17,889**	**16,014**	**17,378**	**16,988**	**17,471**	**16,833**	**17,324**
Colorado	2,420	2,203	2,461	2,386	2,447	2,433	2,506
Montana	2,151	1,968	2,179	2,110	2,148	2,044	2,095
Utah	3,231	2,851	2,875	2,943	3,100	2,927	3,056
Wyoming	10,087	8,992	9,864	9,549	9,775	9,430	9,668
PAD District V	**95,896**	**82,449**	**94,660**	**92,644**	**95,378**	**90,942**	**93,418**
Alaska[b]	62,598	51,879	61,007	59,707	61,357	57,899	59,202
South Alaska	1,508	1,284	1,393	1,318	1,378	1,334	1,402
North Slope	61,091	50,595	59,614	58,389	59,979	56,565	57,801
Arizona	11	10	11	10	11	11	11
California[b]	30,751	28,246	31,235	30,187	31,095	30,076	31,027
Nevada	267	239	266	255	264	244	260
Federal Offshore PAD District V	2,269	2,075	2,141	2,484	2,652	2,712	2,918
U.S. Total[b]	**263,244**	**235,234**	**262,746**	**255,224**	**258,803**	**248,709**	**256,179**
Daily Average	**8,492**	**8,401**	**8,476**	**8,507**	**8,348**	**8,290**	**8,264**

[a] Data is based upon revisions received as of April 1989.
[b] Includes the following offshore production (thousand barrels): Alaska: State - 22,729; California: State - 30,360; Louisiana: State - 25,159; Texas: State - 1,789; U.S. Total, including Federal Offshore - 437,979.
(s) = Less than 500 barrels or less than 500 barrels per day.

This table contains updates on 1987 crude oil production statistics published in the *Petroleum Supply Annual* (PSA), 1987.

Statistics on crude oil production for States and for Federal offshore areas are reported to the Energy Information Administration (EIA) by State government agencies and by the Minerals Management Service, U.S. Department of the Interior. These data are updated periodically by the reporting agencies and are received by the EIA on an ongoing basis. At the time of publication of the 1987 *PSA*, the EIA had not received complete and/or updated statistics on crude oil production for several States. This table is provided to inform the user of updated monthly and annual crude oil production statistics for 1987, and are not subject to further revision by the EIA.

Table C1. Revised[a] Crude Oil Production by PAD District and State, 1987 (Continued)
(Thousand Barrels)

PAD District and State	August	September	October	November	December	Total	Daily Average
PAD District I	**1,271**	**1,252**	**1,284**	**1,212**	**1,301**	**15,134**	**41**
Florida	701	686	713	698	720	8,270	23
New York	61	57	56	52	57	710	2
Pennsylvania	274	269	274	245	285	3,302	9
Virginia	1	2	1	1	3	17	(s)
West Virginia	234	239	240	216	236	2,835	8
PAD District II	**26,206**	**25,968**	**26,962**	**25,411**	**26,157**	**316,645**	**868**
Illinois	2,007	1,983	2,029	2,003	2,086	24,096	66
Indiana	227	343	348	321	356	3,902	11
Kansas	5,006	5,053	5,165	4,835	5,138	60,544	166
Kentucky	474	472	491	448	513	5,752	16
Michigan	2,199	2,118	2,172	2,089	2,125	25,971	71
Missouri	16	14	12	14	13	135	(s)
Nebraska	506	494	509	491	504	6,091	17
North Dakota	3,384	3,341	3,400	3,291	3,423	41,364	113
Ohio	1,006	989	1,017	942	1,010	12,153	33
Oklahoma	11,193	10,973	11,624	10,791	10,793	134,378	368
South Dakota	141	133	142	137	143	1,644	5
Tennessee	47	55	54	50	53	614	2
PAD District III	**116,548**	**113,523**	**118,186**	**113,849**	**116,896**	**1,399,100**	**3,833**
Alabama	1,778	1,692	1,594	1,711	1,758	20,607	56
Arkansas	1,142	1,167	1,204	1,173	1,189	14,230	39
Louisiana[b]	14,846	14,132	15,061	14,172	14,542	175,027	480
Mississippi	2,355	2,274	2,371	2,270	2,376	28,351	78
New Mexico	6,134	6,036	6,287	6,011	6,156	72,328	198
Texas[b]	63,421	61,666	64,215	62,194	63,777	761,707	2,087
Federal Offshore PAD District III	26,871	26,556	27,454	26,318	27,098	326,851	895
PAD District IV	**17,277**	**16,917**	**17,648**	**16,927**	**17,516**	**206,184**	**565**
Colorado	2,503	2,460	2,530	2,398	2,614	29,360	80
Montana	2,099	2,042	2,122	2,062	2,094	25,113	69
Utah	2,934	2,986	3,079	2,890	2,917	35,788	98
Wyoming	9,742	9,429	9,917	9,577	9,891	115,922	318
PAD District V	**93,497**	**89,103**	**95,980**	**95,306**	**97,151**	**1,116,426**	**3,059**
Alaska[b]	59,143	56,232	61,563	62,042	63,325	715,955	1,962
South Alaska	1,310	1,280	1,315	1,297	1,331	16,149	44
North Slope	57,833	54,952	60,249	60,745	61,994	699,806	1,917
Arizona	11	11	12	10	11	131	(s)
California[b]	31,049	30,110	31,255	30,168	30,937	366,137	1,003
Nevada	263	259	269	258	268	3,112	9
Federal Offshore PAD District V	3,032	2,490	2,880	2,828	2,610	31,091	85
U.S. Total[b]	**254,801**	**246,762**	**260,059**	**252,705**	**259,022**	**3,053,488**	**8366**
Daily Average	**8,219**	**8,225**	**8,389**	**8,424**	**8,356**	**8,366**	--

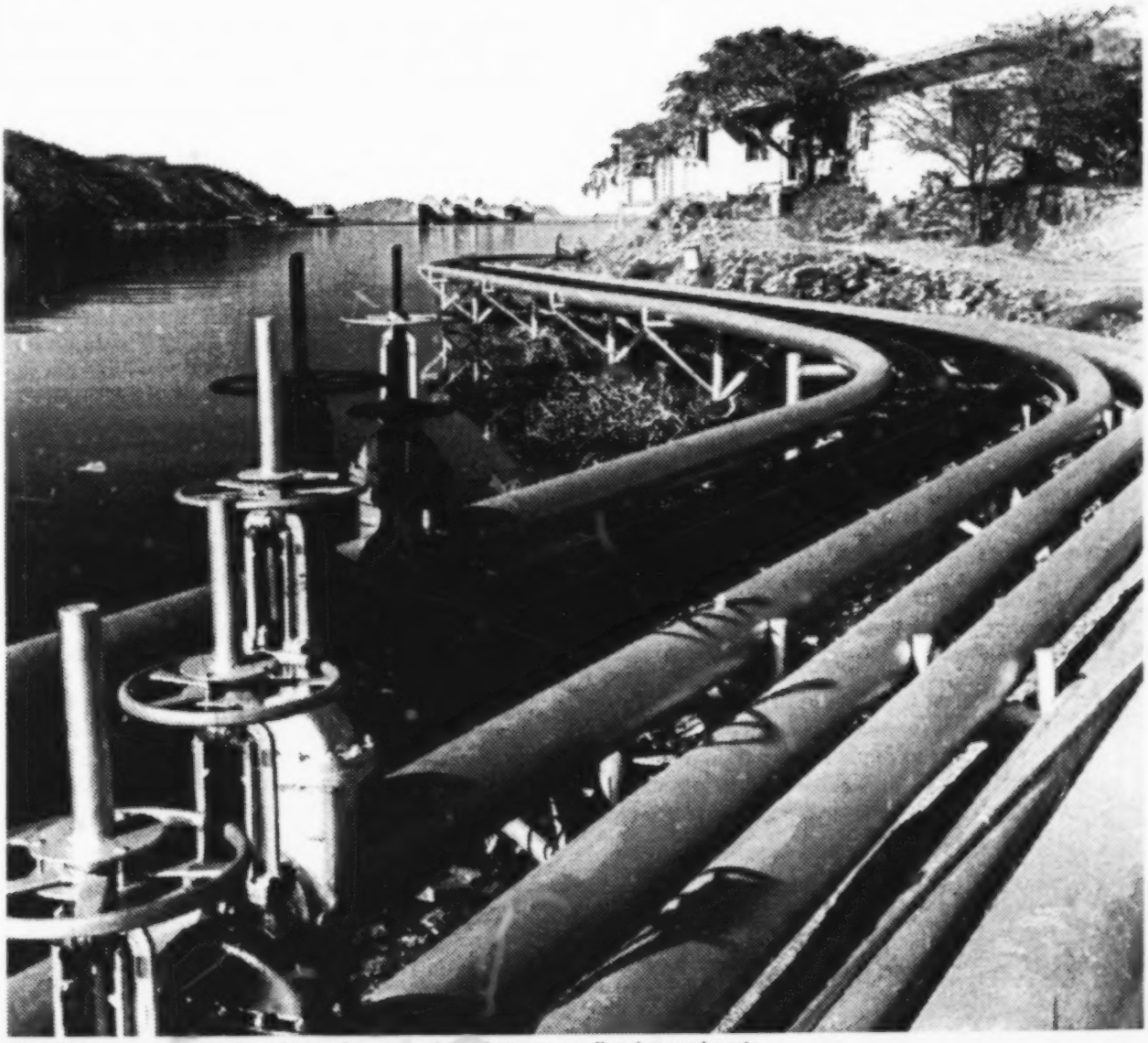
Note: • The EIA did not receive revised crude oil production data from the following states and/or areas in time for publication: Louisiana, Michigan, Missouri, Nevada, PAD District III Federal Offshore, and PAD District V Federal Offshore. • Annual crude oil production for Michigan, New York, Ohio, and Pennsylvania was prorated by month based on first purchaser monthly crude oil volumes collected on Form EIA-182, "Domestic Crude Oil First Purchase Report." • Totals may not equal sum of components due to independent rounding.

Source: State Conservation Agencies and the U.S. Minerals Management Service.

This table contains updates on 1987 crude oil production statistics published in the *Petroleum Supply Annual* (PSA), 1987.

Statistics on crude oil production for States and for Federal offshore areas are reported to the Energy Information Administration (EIA) by State government agencies and by the Minerals Management Service, U.S. Department of the Interior. These data are updated periodically by the reporting agencies and are received by the EIA on an ongoing basis. At the time of publication of the 1987 *PSA*, the EIA had not received complete and/or updated statistics on crude oil production for several States. This table is provided to inform the user of updated monthly and annual crude oil production statistics for 1987, and are not subject to further revision by the EIA.

Glossary



Pipelines carry crude oil and petroleum products between refineries and ports.

Definitions of Petroleum Products and Other Terms

Alcohol. The family name of a group of organic chemical compounds composed of carbon, hydrogen, and oxygen. The series of molecules vary in chain length and are composed of a hydrocarbon plus a hydroxyl group; CH-(CH)n-OH (e.g., methanol, ethanol, and tertiary butyl alcohol (TBA)).

Alkylation. A refining process for chemically combining isobutane with olefin hydrocarbons (e.g., propylene, butylene) through the control of temperature and pressure in the presence of an acid catalyst, usually sulfuric acid or hydrofluoric acid. The product, alkylate, an isoparaffin, has high octane value and is blended with motor and aviation gasoline to improve the antiknock value of the fuel.

API Gravity. An arbitrary scale expressing the gravity or density of liquid petroleum products. The measuring scale is calibrated in terms of degrees API; it may be calculated in terms of the following formula:

$$\text{Degrees API} = \frac{141.5}{sp.gr.60\ F/60\ F} - 131.5$$

Aromatics. Hydrocarbons characterized by unsaturated ring structures of carbon atoms. Commercial petroleum aromatics are benzene, toluene, and xylene (BTX).

Asphalt. A dark-brown-to-black cement-like material containing bitumens as the predominant constituents, obtained by petroleum processing. The definition includes crude asphalt as well as the following finished products: cements, fluxes, the asphalt content of emulsions (exclusive of water), and petroleum distillates blended with asphalt to make cutback asphalts. The conversion factor for asphalt is 5.5 barrels of 42 U.S. gallons per short ton.

ASTM. The acronym for the American Society for Testing and Materials.

Aviation Gasoline (Finished). All special grades of gasoline for use in aviation reciprocating engines, as given in ASTM Specification D910 and Military Specification MIL-G-5572. Excludes blending components which will be used in blending or compounding into finished aviation gasoline.

Aviation Gasoline Blending Components. Naphthas which will be used for blending or compounding into finished aviation gasoline (e.g., straight-run gasoline, alkylate, and reformate). Excludes oxygenates (alcohols, ethers), butane, and pentanes plus.

Barrel. A volumetric unit of measure for crude oil and petroleum products equivalent to 42 U.S. gallons. This measure is used in most statistical reports. Factors for converting petroleum coke, asphalt, still gas and wax to barrels are given in the definitions of these products.

Barrels Per Calendar Day. The maximum number of barrels of input that can be processed during a 24-hour period after making allowances for the following limitations:

the capability of downstream facilities to absorb the output of crude oil processing facilities of a given refinery. No reduction is made when a planned distribution of intermediate streams through other than downstream facilities is part of a refinery's normal operation;

the types and grades of inputs to be processed;

the types and grades of products expected to be manufactured;

the environmental constraints associated with refinery operations;

the reduction of capacity for scheduled downtime such as routine inspection, mechanical problems, maintenance, repairs, and turnaround; and

the reduction of capacity for unscheduled downtime such as mechanical problems, repairs, and slowdowns.

Barrels Per Stream Day. The amount a unit can process running at full capacity under optimal crude oil and product slate conditions.

Benzene. An aromatic hydrocarbon, (C_6H_6), present to a minor degree in most crude oils. Some important products manufactured from benzene are: styrene, phenol, nylon, aniline, and synthetic detergents.

Butane. A normally gaseous straight-chain or branch-chain hydrocarbon, (C4H10). It is extracted from natural gas or refinery gas streams. It includes isobutane and normal butane and is designated in ASTM Specification D1835 and Gas Processors Association Specifications for commercial butane.

> ***Isobutane.*** A normally gaseous branch-chain hydrocarbon, (C4H10). It is a colorless paraffinic gas that boils at a temperature of 10.9 degrees F. It is extracted from natural gas or refinery gas streams.
>
> ***Normal Butane.*** A normally gaseous straight-chain hydrocarbon, (C4H10). It is a colorless paraffinic gas that boils at a temperature of 31.1 degrees F. It is extracted from natural gas or refinery gas streams.

Butylene. An olefinic hydrocarbon, (C4H8), recovered from refinery processes.

Catalytic Cracking. The refining process of breaking down the larger, heavier, and more complex hydrocarbon molecules into simpler and lighter molecules. Catalytic cracking is accomplished by the use of a catalytic agent and is an effective process for increasing the yield of gasoline from crude oil. Catalytic cracking processes fresh feeds and recycled feeds.

> ***Fresh Feeds.*** Crude oil or petroleum distillates which are being fed to processing units for the first time.
>
> ***Recycled Feeds.*** Feeds that are continuously fed back for additional processing.

Catalytic Hydrocracking. A refining process that uses hydrogen and catalysts with relatively low temperatures and high pressures for converting middle boiling or residual material to high-octane gasoline, reformer charge stock, jet fuel and/or high grade fuel oil. The process uses one or more catalysts, depending upon product output, and can handle high sulfur feedstocks without prior desulfurization.

Catalytic Hydrotreating. A refining process for treating petroleum fractions from atmospheric or vacuum distillation units (e.g., naphthas, middle distillates, reformer feeds, residual fuel oil, and heavy gas oil) and other petroleum (e.g., cat cracked naphtha, coker naphtha, gas oil, etc.) in the presence of catalysts and substantial quantities of hydrogen. Hydrotreating includes desulfurization, removal of substances (e.g., nitrogen compounds) that deactivate catalysts, conversion of olefins to paraffins to reduce gum formation in gasoline, and other processes to upgrade the quality of the fractions.

Catalytic Reforming. A refining process using controlled heat and pressure with catalysts to rearrange certain hydrocarbon molecules, thereby converting paraffinic and naphthenic type hydrocarbons (e.g., low-octane gasoline boiling range fractions) into petrochemical feedstocks and higher octane stocks suitable for blending into finished gasoline. Catalytic reforming is reported in two categories. They are:

> ***Low Pressure.*** A processing unit operating at less than 225 pounds per square inch gauge (PSIG) measured at the outlet separator.
>
> ***High Pressure.*** A processing unit operating at either equal to or greater than 225 pounds per square inch gauge (PSIG) measured at the outlet separator.

Charge Capacity. The input (feed) capacity of the refinery processing facilities.

Coal. A generic term applied to carbonaceous rocks that were formed by the partial or complete decomposition of vegetation. These stratified carbonaceous rocks are either solid or brittle and are highly combustible. Includes lignite, bituminous coal, and anthracite which conform to ASTM Specification D388.

Crude Distillation. The refining process of separating crude oil components at atmospheric pressure by heating to temperatures of about 600 degrees F to 750 degrees F (depending on the nature of the crude oil and desired products) and subsequent condensing of the fractions by cooling.

Crude Oil (including Lease Condensate). A mixture of hydrocarbons that existed in liquid phase in underground reservoirs and remains liquid at atmospheric pressure after passing through surface-separating facilities. Included are lease condensate and liquid hydrocarbons produced from tar sands, gilsonite, and oil shale. Drip gases are also included, but topped crude oil (residual oil) and other unfinished oils are excluded. Liquids produced at natural gas processing plants and mixed with crude oil are likewise excluded where identifiable. Crude oil is considered as either domestic or foreign, according to the following:

> ***Domestic.*** Crude oil produced in the United States or from its "outer continental shelf" as defined in 43 USC 1331.
>
> ***Foreign.*** Crude oil produced outside the United States. Imported Athabasca hydrocarbons are included.

Delayed Coking. A process by which heavier crude oil fractions can be thermally decomposed under conditions of elevated temperatures and pressure to produce a mixture of lighter oils and petroleum coke. The light oils can be processed further in other refinery units to meet product specifications. The coke can be used either as a fuel or in other applications such as the manufacturing of steel or aluminum.

Distillate Fuel Oil. A general classification for one of the petroleum fractions produced in conventional distillation operations. It is used primarily for space heating, on-and-off-highway diesel engine fuel including railroad engine fuel and fuel for agricultural machinery), and electric power generation. Included are products known as No. 1, No. 2, and No. 4 fuel oils; No. 1, No. 2, and No. 4 diesel fuels.

No. 1 Fuel Oil . A light distillate fuel oil intended for use in vaporizing pot-type burners. ASTM Specification D396 specifies for this grade maximum distillation temperatures of 400 degrees F at the 10-percent recovery point and 550 degrees F at the 90-percent point, and kinematic viscosities between 1.4 and 2.2 centistokes at 100 degrees F.

No. 2 Fuel Oil. A distillate fuel oil for use in atomizing-type burners for domestic heating or for moderate capacity commercial-industrial burner units. ASTM Specification D396 designates minimum and maximum distillation temperatures at the 90-percent recovery point of 540 degrees F and 640 degrees F, and kinematic viscosities between 2.0 and 3.6 centistokes at 100 degrees F.

No. 1 and No. 2 Diesel Fuel Oils. Distillate fuel oils used in compression-ignition engines, as designated in the ASTM Specification D975:

No. 1-D. A volatile distillate fuel oil with a maximum distillation temperature of 550 degrees F at the 90-percent recovery point for use in high-speed diesel engines generally operated under variations in speed and load. Includes type C-B diesel fuel used for city buses and similar operations. Properties are defined in ASTM Specification D975.

No. 2-D. A gas oil type distillate of lower volatility with minimum and maximum distillation temperatures at the 90-percent recovery point of 540 and 640 degrees F for use in high-speed diesel engines generally operated under uniform speed and load conditions. Includes Type R-R diesel fuel used for railroad locomotive engines, and Type T-T for diesel-engine trucks. Properties are defined in ASTM Specification D975.

No. 4 Fuel Oil. A fuel oil for commercial burner installations not equipped with preheating facilities. It is used extensively in industrial plants. This grade is a blend of distillate fuel oil and residual fuel oil stocks that conforms to ASTM Specification D396 or Federal Specification VV-F-815C; with minimum and maximum kinematic viscosities between 5.8 and 26.4 centistokes at 100 degrees F. Also included is No. 4-D, a fuel oil for low and medium-speed diesel engines that conforms to ASTM Specification D975.

Eastern Hemisphere. That half of the earth east of the Atlantic Ocean which includes Europe, Asia, Africa and Australia.

Electricity (Purchased). Electricity purchased for refinery operations that is not produced within the refinery complex.

Ethane. A normally gaseous straight-chain hydrocarbon, (C_2H_6). It is a colorless paraffinic gas that boils at a temperature of -127.48 degrees F. It is extracted from natural gas and refinery gas streams.

Ether. A generic term applied to a group of organic chemical compounds composed of carbon, hydrogen, and oxygen, characterized by an oxygen atom attached to two carbon atoms (e.g., methyl tertiary butyl ether).

Ethylene. An olefinic hydrocarbon, (C_2H_4), recovered from refinery processes or petrochemical processes.

Field Production. Represents crude oil production on leases, natural gas liquids production at natural gas processing plants, and new supply of other hydrocarbons and alcohol.

Flexicoking. A thermal cracking process which converts heavy hydrocarbons such as crude oil, tar sands bitumen, and distillation residues into light hydrocarbons. Feedstocks can be any pumpable hydrocarbons including those containing high concentrations of sulfur and metals.

Fluid Coking. A thermal cracking process utilizing the fluidized-solids technique to remove carbon (coke) for continuous conversion of heavy, low-grade oils into lighter products.

Fuels Solvent Deasphalting. A refining process for removing asphalt compounds from petroleum fractions, such as reduced crude oil. The recovered stream from this process is used to produce fuel products.

Gas Oil. A liquid petroleum distillate having a viscosity between that of kerosene and lubricating oil. It derives its

name from having originally been used in the manufacture of illuminating gas. It is now used to produce distillate fuel oils and gasoline.

Gasohol. See Motor Gasoline (Finished).

Gasoline Blending Components. Naphthas which will be used for blending or compounding into finished aviation or motor gasoline (e.g., straight-run gasoline, alkylate, and reformate). Excludes oxygenates (alcohols, ethers), butane, and pentanes plus.

Heavy Gas Oil. Petroleum distillates with an approximate boiling range from 651 degrees F to 1000 degrees F.

Hydrogen. The lightest of all gases, occurring chiefly in combination with oxygen in water; also in acids, bases, alcohols, petroleum, and other hydrocarbons.

Idle Capacity. The component of operable capacity that is not in operation and not under active repair, but capable of being placed in operation within 30 days; and capacity not in operation but under active repair that can be completed within 90 days.

Imported Crude Oil Burned As Fuel. The amount of foreign crude oil burned as a fuel oil, usually as residual fuel oil, without being processed as such. Imported crude oil burned as fuel includes lease condensate and liquid hydrocarbons produced from tar sand oil, gilsonite, and shale oil.

Isobutane. See Butane.

Isohexane. A saturated branch-chain hydrocarbon, (C_6H_{14}). It is a colorless liquid that boils at a temperature of 156.2 degrees F.

Isomerization. A refining process which alters the fundamental arrangement of atoms in the molecule without adding or removing anything from the original material. Used to convert normal butane into isobutane, (C4), an alkylation process feedstock, and normal pentane and hexane into isopentane, (C5), and isohexane, (C6), high-octane gasoline components.

Isopentane. See Natural Gasoline and Isopentane.

Kerosene. A petroleum distillate that has a maximum distillation temperature of 401 degrees F at the 10-percent recovery point, a final boiling point of 572 degrees F, and a minimum flash point of 100 degrees F. Included are the two grades designated in ASTM D3699: No. 1-K and No. 2-K, and all grades of kerosene called range or stove oil. Kerosene is used in space heaters, cook stoves, and water heaters and is suitable for use as an illuminant when burned in wick lamps.

Kerosene-type Jet Fuel. A quality kerosene product with a maximum distillation temperature of 400 degrees F at the 10-percent recovery point and a final maximum boiling point of 572 degrees F. The fuel is designated in ASTM Specification D1655 and Military Specification MIL-T-5624L (Grades JP-5 and JP-8). A relatively low-freezing point distillate of the kerosene type used primarily for commercial turbojet and turboprop aircraft engines.

Lease Condensate. A natural gas liquid recovered from gas well gas (associated and non-associated) in lease separators or natural gas field facilities. Lease condensate consists primarily of pentanes and heavier hydrocarbons.

Light Gas Oils. Liquid petroleum distillates heavier than naphtha, with an approximate boiling range from 401 degrees F to 650 degrees F.

Liquefied Petroleum Gases (LPG). Ethane, ethylene, propane, propylene, normal butane, butylene, and isobutane produced at refineries or natural gas processing plants, including plants that fractionate raw natural gas plant liquids.

Liquefied Refinery Gases (LRG). Liquefied petroleum gases fractionated from refinery or still gases. Through compression and/or refrigeration, they are retained in the liquid state. The reported categories are ethane/ethylene, propane/propylene, normal butane/butylene, and isobutane. Excludes still gas.

Lubricating Oils. A substance used to reduce friction between bearing surfaces. Petroleum lubricants may be produced either from distillates or residues. Other substances may be added to impart or improve certain required properties. Do not include byproducts of lubricating oil refining such as aromatic extracts derived from solvent extraction or tars derived from deasphalting. "Lubricants" includes all grades of lubricating oils from spindle oil to cylinder oil and those used in greases. The three categories include:

> ***Bright Stock.*** A refined, high viscosity lubricating oil base stock that is usually made from a residuum by a treatment such as deasphalting, acid treatment, or solvent extraction.
>
> ***Neutral.*** A distillate lubricating oil base stock with a viscosity that is usually not above 550 Saybolt Universal Seconds (SUS) at 100 degrees F. A product of hydrotreating, acid treatment, or solvent extraction.

Other. A lubricating oil base stock used in finished lubricating oils and greases, including black, coastal, and red oils.

Middle Distillates. A general classification that includes distillate fuel oil and kerosene.

Miscellaneous Products. Includes all finished products not classified elsewhere (e.g., petrolatum, lube refining byproducts (aromatic extracts and tars), absorption oils, ram-jet fuel, petroleum rocket fuels, synthetic natural gas feedstocks, and specialty oils).

Motor Gasoline (Finished). A complex mixture of relatively volatile hydrocarbons, with or without small quantities of additives, that have been blended to form a fuel suitable for use in spark-ignition engines. Motor gasoline, as given in ASTM Specification D439 or Federal Specification VV-G-1690B, include a range in distillation temperatures from 122 to 158 degrees F at the 10-percent recovery point and from 365 to 374 degrees F at the 90-percent recovery point. The Reid Vapor Pressure ranges from 9 to 15 psi. "Motor gasoline" includes finished leaded gasoline, finished unleaded gasoline, and gasohol. Blendstock is excluded until blending has been completed. Alcohol that is to be used in the blending of gasohol is also excluded.

Finished Leaded Gasoline. Contains more than 0.05 gram of lead per gallon or more than 0.005 gram of phosphorus per gallon. Premium and regular grades are included, depending on the octane rating. Includes leaded gasohol. Blendstock is excluded until blending has been completed. Alcohol that is to be used in the blending of gasohol is also excluded.

Finished Unleaded Gasoline. Contains not more than 0.05 gram of lead per gallon and not more than 0.005 gram of phosphorus per gallon. Premium and regular grades are included, depending on the octane rating. Includes unleaded gasohol. Blendstock is excluded until blending has been completed. Alcohol that is to be used in the blending of gasohol is also excluded.

Gasohol. A blend of finished motor gasoline (leaded or unleaded) and alcohol (generally ethanol but sometimes methanol), limited to 10 percent by volume of alcohol.

Motor Gasoline Blending Components. Naphthas which will be used for blending or compounding into finished motor gasoline (e.g. straight-run gasoline, alkylate, and reformate). Excludes oxygenates (alcohols, ethers), butane, and pentanes plus.

Naphtha. A generic term applied to a petroleum fraction with an approximate boiling range between 122 and 400 degrees F.

Naphtha-type Jet Fuel. A fuel in the heavy naphtha boiling range. ASTM Specification D1655 specifies for this fuel maximum distillation temperatures of 290 degrees F at the 20-percent recovery point and 470 degrees F at the 90-percent point, meeting Military Specification MIL-T-5624L (Grade JP-4). JP-4 is used for turbojet and turboprop aircraft engines, primarily by the military. Excludes ram-jet and petroleum rocket fuels.

Natural Gas. A mixture of hydrocarbons and small quantities of various nonhydrocarbons existing in the gaseous phase or in solution with crude oil in underground reservoirs.

Natural Gas Field Facility. A field facility designed to process natural gas produced from more than one lease for the purpose of recovering condensate from a stream of natural gas; however, some field facilities are designed to recover propane, normal butane, pentanes plus, etc., and to control the quality of natural gas to be marketed.

Natural Gas Plant Liquids. Natural gas liquids recovered from natural gas in gas processing plants, and in some situations, from natural gas field facilities. Natural gas liquids extracted by fractionators are also included. These liquids are defined according to the published specifications of the Gas Processors Association and the American Society for Testing and Materials and are classified as follows: ethane, propane, normal butane, isobutane, pentanes plus, and other products from natural gas processing plants (i.e., products meeting the standards for finished petroleum products produced at natural gas processing plants, such as finished motor gasoline, finished aviation gasoline, special naphthas, kerosene, distillate fuel oil, and miscellaneous products).

Natural Gas Processing Plant. A gas processing plant is a facility designed (1) to achieve the recovery of natural gas liquids from the stream of natural gas which may or may not have been processed through lease separators and field facilities, and (2) to control the quality of the natural gas to be marketed. Cycling plants are classified as gas processing plants.

Natural Gasoline and Isopentane. A mixture of hydrocarbons, mostly pentanes and heavier, extracted from natural gas, that meets vapor pressure, end-point, and other specifications for natural gasoline set by the Gas Processors Association. Includes isopentane which is a saturated branch-chain hydrocarbon, (C_5H_{12}), obtained by fractionation of natural gasoline or isomerization of normal pentane.

Normal Butane. See Butane.

OPEC. The acronym for the Organization of Petroleum Exporting Countries, that have organized for the purpose of negotiating with oil companies on matters of oil production, prices and future concession rights. Current members are Algeria, Ecuador, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela.

Operable Capacity. The amount of capacity that, at the beginning of the period, is in operation; not in operation and not under active repair, but capable of being placed in operation within 30 days; or not in operation but under active repair that can be completed within 90 days. Operable capacity is the sum of the operating and idle capacity and is measured in barrels per calendar day or barrels per stream day.

Operating Capacity. The component of operable capacity that is in operation at the beginning of the period.

Other Hydrocarbons. Materials received by a refinery and consumed as a raw material. Includes hydrogen, coal tar derivatives, gilsonite, and natural gas received by the refinery for reforming into hydrogen. Natural gas to be used as fuel is excluded.

Oxygenates. Oxygenates include both alcohols and ethers used as octane boosting additives for gasoline (e.g., methyl tertiary butyl ether).

Pentanes Plus. A mixture of hydrocarbons, mostly pentanes and heavier, extracted from natural gas. Includes isopentane, natural gasoline, and plant condensate.

Petrochemical Feedstocks. Chemical feedstocks derived from petroleum principally for the manufacture of chemicals, synthetic rubber, and a variety of plastics. The categories reported are "Naphtha-Less than 400 degrees F" and "Other oils over 400 degrees F."

> ***Naphtha-Less Than 400 Degrees F.*** A naphtha with a boiling range of less than 400 degrees F that is intended for use as a petrochemical feedstock.
>
> ***Other Oils-Over 400 Degrees F.*** Oils with a boiling range of over 400 degrees F that is intended for use as a petrochemical feedstock.

Petroleum Coke. A residue, the final product of the condensation process in cracking. This product is reported as marketable coke or catalyst coke. The conversion factor is 5 barrels of 42 U.S. gallons per short ton.

> ***Marketable Coke.*** Those grades of coke produced in delayed or fluid cokers which may be recovered as relatively pure carbon. This "green" coke may be sold as is or further purified by calcining.
>
> ***Catalyst Coke.*** In many catalytic operations (e.g., catalytic cracking) carbon is deposited on the catalyst, thus deactivating the catalyst. The catalyst is reactivated by burning off the carbon, which is used as a fuel in the refining process. This carbon or coke is not recoverable in a concentrated form.

Petroleum Products. Petroleum products are obtained from the processing of crude oil (including lease condensate), natural gas, and other hydrocarbon compounds. Petroleum products include unfinished oils, liquefied petroleum gases, pentanes plus, aviation gasoline, motor gasoline, naphtha-type jet fuel, kerosene-type jet fuel, kerosene, distillate fuel oil, residual fuel oil, petrochemical feedstocks, special naphthas, lubricants, waxes, petroleum coke, asphalt, road oil, still gas, and miscellaneous products.

Plant Condensate. One of the natural gas liquids, mostly pentanes and heavier hydrocarbons, recovered and separated as liquids at gas inlet separators or scrubbers in processing plants.

Primary Stocks. Stocks of crude oil or petroleum products held in storage at (or in) leases, refineries, natural gas processing plant pipelines, tankfarms, and bulk terminals that can store at least 50,000 barrels of petroleum products or that can receive petroleum products by tanker, barge, or pipeline. Crude oil that is in-transit by water from Alaska, or that is stored on Federal leases or in the Strategic Petroleum Reserve is included. Primary Stocks exclude stocks of foreign origin that are held in bonded warehouse storage.

Production Capacity. The amount of product that can be produced from processing facilities.

Propane. A normally gaseous straight-chain hydrocarbon, (C_3H_8). It is a colorless paraffinic gas that boils at a temperature of -43.67 degrees F. It is extracted from natural gas or refinery gas streams. It includes all products designated in ASTM Specification D1835 and Gas Processors Association Specifications for commercial propane and HD-5 propane.

Propylene. An olefinic hydrocarbon, (C_3H_6), recovered from refinery processes or petrochemical processes.

Refinery. An installation that manufactures finished petroleum products from crude oil, unfinished oils, natural gas liquids, other hydrocarbons, and alcohol.

Residual Fuel Oil. The heavier oils that remain after the distillate fuel oils and lighter hydrocarbons are distilled away in refinery operations and that conform to ASTM Specifications D396 and 975. Included are No. 5, a residual fuel oil of medium viscosity; Navy Special, for use in steam-powered vessels in government service and in shore power plants; No. 6, which includes Bunker C fuel oil, and is used for commercial and industrial heating, electricity generation and to power ships. Imports of residual fuel oil include imported crude oil burned as fuel.

Residuum. Residue from crude oil after distilling off all but the heaviest components, with a boiling range greater than 1000 degrees F.

Road Oil. Any heavy petroleum oil, including residual asphaltic oil used as a dust palliative and surface treatment on roads and highways. It is generally produced in six grades from 0, the most liquid, to 5, the most viscous.

Shell Storage Capacity. The design capacity of a petroleum storage tank and is always greater than or equal to working storage capacity.

Special Naphthas. All finished products within the naphtha boiling range that are used as paint thinners, cleaners, or solvents. These products are refined to a specified flash point. Special naphthas include all commercial hexane and cleaning solvents conforming to ASTM Specification D1836 and D484, respectively. Naphthas to be blended or marketed as motor gasoline or aviation gasoline, or that are to be used as petrochemical and synthetic natural gas (SNG) feedstocks are excluded.

Steam (Purchased). Steam, purchased for use by a refinery, that was not generated from within the refinery complex.

Still Gas (Refinery Gas). Any form or mixture of gases produced in refineries by distillation, cracking, reforming, and other processes. The principal constituents are methane, ethane, ethylene, normal butane, butylene, propane, propylene, etc. Still gas is used as a refinery fuel and a petrochemical feedstock. The conversion factor is 6.000 million Btu's per barrel (42 U.S. gallons).

Strategic Petroleum Reserve (SPR). Petroleum stocks maintained by the Federal Government for use during periods of major supply interruption.

Sulfur. A nonmetallic element of lemon-yellow color, sometimes known as "brimstone."

Thermal Cracking. A refining process in which heat and pressure are used to break down, rearrange, or combine hydrocarbon molecules. Thermal cracking includes gas oil, visbreaking, fluid coking, delayed coking, and other thermal cracking processes (e.g., flexicoking). See individual categories for definition.

Toluene. An aromatic hydrocarbon, (C6H5CH3), somewhat similar to benzene but of a higher boiling point produced in the coking of coal and also by petroleum refining processes. It is the basis of dyes, explosives, and aromatic compounds. Along with xylene, it is a key component in unleaded gasoline.

Unfinished Oils. Includes all oils requiring further processing, except those requiring only mechanical blending. Includes naphthas, kerosene, light and heavy gas oils, and residuum. See individual categories for definition.

Unfractionated Streams. Mixtures of unsegregated natural gas liquid components excluding those in plant condensate. This product is extracted from natural gas.

Vacuum Distillation. Distillation under reduced pressure (less the atmospheric) which lowers the boiling temperature of the liquid being distilled. This technique with its relatively low temperatures prevents cracking or decomposition of the charge stock.

Visbreaking. A thermal process in which heavy atmospheric or vacuum-still bottoms are cracked at moderate temperatures to increase production of distillate products and reduce viscosity of the distillation residues.

Wax. A solid or semi-solid material derived from petroleum distillates or residues by such treatments as chilling, precipitating with a solvent, or de-oiling. It is light-colored, more-or-less translucent crystalline mass, slightly greasy to the touch, consisting of a mixture of solid hydrocarbons in which the paraffin series predominates. Includes all marketable wax whether crude scale or fully refined. The three grades included are microcrystalline, crystalline-fully refined, and crystalline-other. The conversion factor is 280 pounds per 42 U.S. gallons per barrel.

> ***Microcrystalline Wax.*** Wax extracted from certain petroleum residues having a finer and less apparent crystalline structure than paraffin wax and having the following physical characteristics: Penetration at 77 degrees F (D1321)-60 maximum. Viscosity at 210 degrees F in Saybolt Universal Seconds (SUS). (D88)-60 SUS (10.22 centistokes) minimum to 150 SUS (31.8 centistokes) maximum. Oil content (D721)-5 percent minimum.
>
> ***Crystalline-Fully Refined Wax.*** A light-colored paraffin wax having the following characteristics: Viscosity at 210 degrees F (D88)-59.9 SUS (10.18 centistokes)

maximum. Oil content (D721)-0.5 percent maximum. Other +20 color, Saybolt minimum.

Crystalline-Other Wax. A paraffin wax having the following characteristics: Viscosity at 210 degrees F (D88)-59.9 SUS (10.18 centistokes) maximum. Oil content (D721)-0.51 percent minimum to 15 percent maximum.

Western Hemisphere. That half of the earth that includes North and South America and adjacent islands.

Working Storage Capacity. The volume between the maximum safe fill capacity and the quantity below which pump suction is ineffective (bottoms).

Xylene. An aromatic hydrocarbon, (C6H4(CH3)2), produced in petroleum refining (cracking) processes. One important use is as a solvent in the manufacture of paints. Along with toluene, it is a key ingredient in unleaded gasoline.

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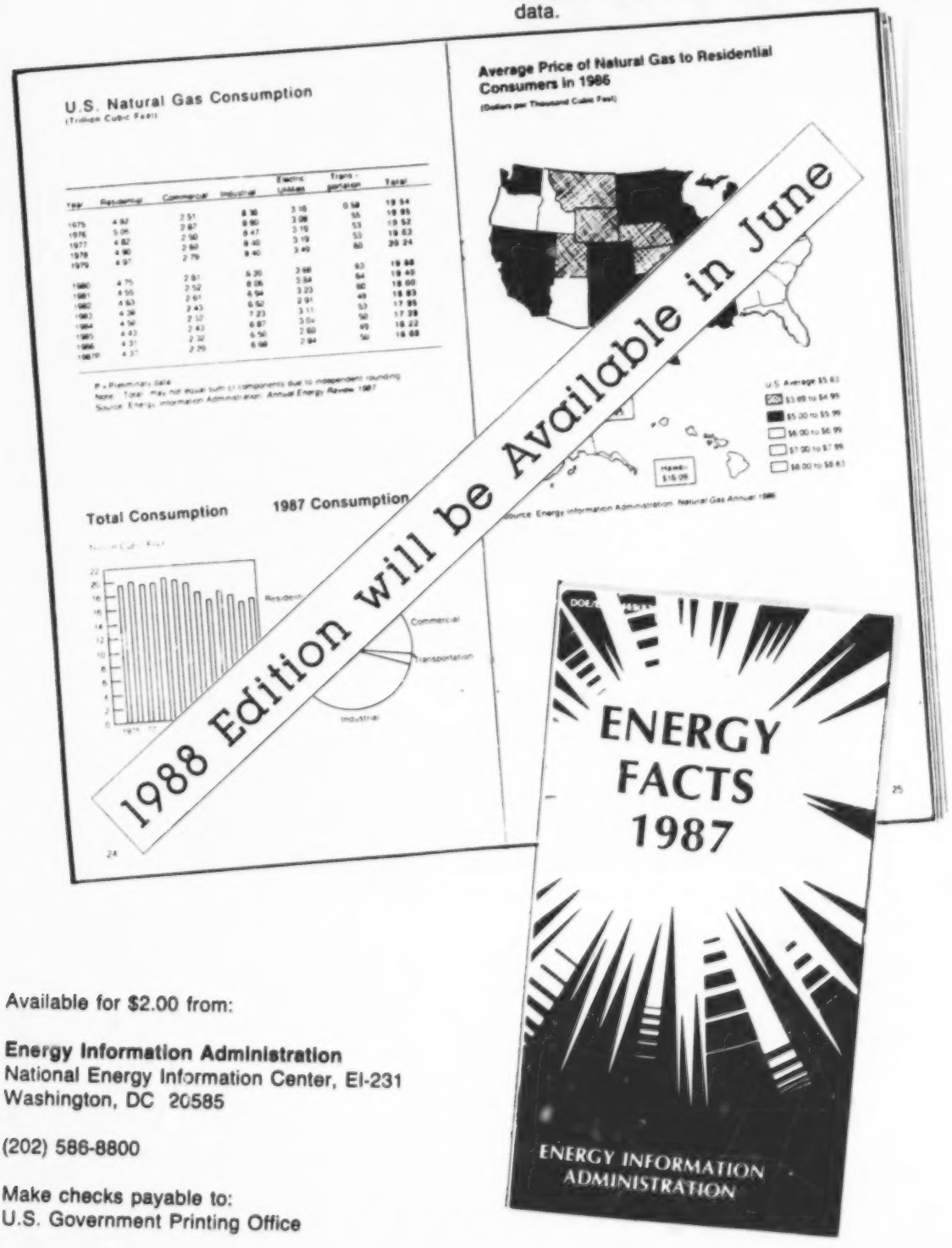
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